THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY,

CHENNAI, TAMILNADU.

GOVERNMENT KILPAUK MEDICAL COLLEGE,

CHENNAI.

Dissertation on

"PSYCHIATRIC MORBIDITY IN PEOPLE WITH TUBERCULOSIS: A CROSS SECTIONAL STUDY",

Submitted for M.D. Degree examinations

BRANCH – XVIII

(PSYCHIATRY)

April 2017

BONAFIDE CERTIFICATE

This to certify that the Dissertation entitled "**PSYCHIATRIC MORBIDITY IN PEOPLE WITH TUBERCULOSIS: A CROSS SECTIONAL STUDY**", is a bonafide record of work done by Dr. D. DAVID MALAIARASAN in the department of Psychiatry, Government Kilpauk Medical College, Chennai, during his Post Graduate Course from 2014 to 2017. This is submitted as partial fulfilment for the requirement of M.D. Degree examinations – Branch – XVIII (Psychiatry) to be held in **April 2017**.

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CERTIFICATE

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DECLARATION

I, Dr D. David Malaiarasan, solemnly declare that the dissertation titled "**PSYCHIATRIC MORBIDITY IN PEOPLE WITH TUBERCULOSIS: A CROSS SECTIONAL STUDY**" is a bonafide work done by me in Government Kilpauk Medical College, Chennai, during January 2016 – June 2016 under the guidance and supervision of Professor **Dr M. Malaippan, MD (Psychiatry)**.

This dissertation is submitted to "**The Tamilnadu Dr M.G.R. Medical University, Chennai**", Tamilnadu as a partial fulfillment for the requirement of **M.D.** Degree examinations – Branch – XVIII (Psychiatry) to be held in **April 2017.**

(DR D. DAVID MALAIARASAN)

Place: Chennai

Date:

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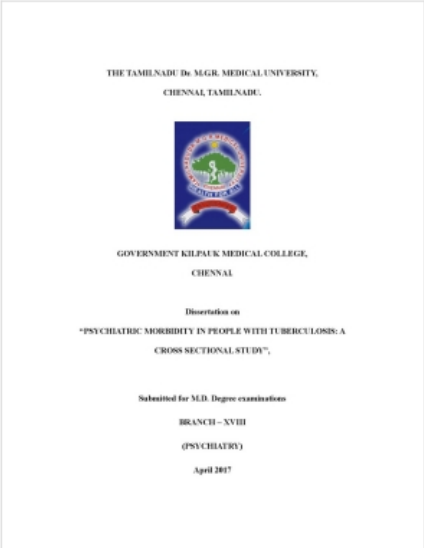

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CONTENTS

ABBREVIATIONS

ADS	:Alcohol Dependence Syndrome
AFB	:Acid Fast Bacillus
ATT	:Anti Tubercular Treatment
AUDIT	:Alcohol Use Disorder Identification Test
CAT I	:Category I Anti Tubercular Treatment
CAT II	:Category II Anti Tubercular Treatment
COPD	:Chronic Obstructive Pulmonary Disease
DM	:Diabetes Mellitus
FTND	:Fagerstrom Test for Nicotine Dependence
HAM-A	:Hamilton rating scale for Anxiety
HAM-D	:Hamilton rating scale for Depression
HIV	:Human Immunodeficiency Virus
MDR-TB	:Multi-Drug Resistant Tuberculosis
NDS	:Nicotine Dependence Syndrome
RR-TB	:Rifampicin Resistant Tuberculosis
TB	:Tuberculosis
WHO	:World Health Organisation
XDR-TB	:Extensive Drug Resistant Tuberculosis

INTRODUCTION:

Tuberculosis is an infectious disease caused by the bacteria belonging to the Mycobacterium tuberculosis complex. According to the World Health Organisation, tuberculosis (TB) is a major global health problem. TB ranks alongside human immunodeficiency virus as a leading cause of death worldwide. India has the highest incidence of TB in the world. It is estimated that, in 2014, there were 2 to 2.3 million incident cases in India. India, Indonesia and China were the three countries with the largest number of cases - 23%, 10% and 10% of the total global cases, respectively. India is also one of the 11 high burden countries in the world, the others being Brazil, Cambodia, China, Ethiopia, Myanmar, Pakistan, the Philippines, Uganda, Vietnam and Zimbabwe. India has the highest prevalence of TB in the world – 2.5 million cases, which is more than that of China, which has a prevalence of 1.2 million (WHO, Global tuberculosis report 2015).

Tuberculosis and psychiatric disorders have many common risk factors including homelessness, HIV positive serology and alcohol or substance abuse (Doherty, A. M., 2013). Also, TB is associated with financial burden (Rajeswari R, 1999), poor quality of life and stigma, which again increase the risk of psychiatric illnesses. Presence of psychiatric illnesses like depression can affect TB outcome through poor compliance DiMatteo, M. R., 2000). Chronic alcohol use is associated with impaired immune functioning in the body (Szabo G, 1999), which can predispose an individual to tuberculosis disease. Smoking can

affect lung defence mechanisms, thereby increasing the risk of TB (Den Boon S, 2005). There is significant interplay between TB and psychiatric illnesses including alcohol and substance use disorders.

In this study, we have attempted to study the prevalence of psychiatric disorders in people with tuberculosis, so as to improve the understanding of the interplay between and psychiatric illnesses and tuberculosis and improve the outcome of tuberculosis.

AIMS & OBJECTIVES

- To assess the prevalence of psychiatric illnesses in people undergoing treatment for tuberculosis.
- To assess the association between psychiatric comorbidity and different sociodemographic factors (age, gender, education) and tuberculosis disease related factors.
- To assess the relationship between psychiatric co-morbidity and negative behavioural factors like history of defaulting.

REVIEW OF LITERATURE:

The most common agent causing tuberculosis is Mycobacterium tuberculosis. Other agents include M.bovis, M.caprae, M.africanum, M.microti, M.pinnipedii and a few others. The bacteria are spread through droplet infection. The disease most commonly affects the lungs, but other organs can also be involved. Only a small percentage of people who are exposed to the

bacteria develop the disease. In people with compromised immunity like those with HIV, the probability of developing the disease is much greater.

M. tuberculosis is a rod shaped bacterium and is often neutral on Gram's staining. However, once stained, it cannot be de-colourised by acid alcohol. They are therefore classified as acid-fast bacilli. The risk of developing tuberculosis depends on host factors like the innate immunologic and non-immunologic defences. Bacilli may sometimes persist for years before disease develops. Only a small proportion of the inhaled bacilli reach the alveoli as most are trapped in the upper airways. In the alveoli, alveolar macrophages phagocytose the bacilli. The bacilli may successfully inhibit the phagosome-lysosome fusion through a complex series of events. Afterwards, the replication of bacilli inside the macrophages begins. The macrophage then ruptures and releases the bacilli, which then reinfect other macrophages.

Two host responses develop about 2-4 weeks after infection - the macrophage-activating response and the tissue damaging response. The macrophages, in response to bacillary antigens, stimulate T cells to release a number of cytokines. The cytokines then activate local macrophages, which then collect around the lesion and effectively neutralise the bacilli. In the central part, there is necrotic material – caseous necrosis. The tissue damaging response is a delayed type hypersensitivity (Type IV hypersensitivity). It destroys unactivated macrophages containing the bacilli as well as causing caseous necrosis of involved tissues. Bronchial walls and blood vessels are

also destroyed and cavities are formed. Liquefied caseous material is drained through the bronchi and contain large numbers of bacilli.

Tuberculosis can be pulmonary, extrapulmonary, or both. Pulmonary TB is most common form. Pulmonary TB can be primary or postprimary. Primary TB occurs soon after the initial infection. It may be asymptomatic or produce symptoms like fever and pleuritic chest pain. Post-primary TB is also called as reactivation or secondary TB, or adult-type TB. It may result from endogenous reactivation of primary infection or from recent re-infection. Symptoms most commonly presented include evening rise of temperature, night sweats, weigh loss, cough, loss of appetite and general weakness.

Any organ system may be affected in TB. The proportion of patients with extrapulmonary tuberculosis is estimated to be about 12%. The most common sites of extrapulmonary tuberculosis are bones/joints (27.1%) and cervical lymph nodes (17.7%). Other sites include genitourinary, peritoneal, other lymph sites and meninges (Yang Z, 2004).

Tuberculous meningitis deserves special mention, as many of the clinical features may be non-specific and diagnosis may sometimes be difficult. Characteristic macroscopic cerebral pathology is a yellowish, gelatinous, inflammatory exudate, at the base of the brain in the anterior basal cisterns, brainstem and cerebellum, extending along the lateral sulci. Cerebrospinal fluid (CSF) flow may become obstructed resulting in hydrocephalus. Arteritis and infarcts can occur. Onset of illness is usually insidious, with low grade fever

that may be delayed considerably. Neck stiffness may be seen, but may be very mild. Meningism is reported in only 2% of cases initially. Clinical features include a vague prodromal phase lasting 2-3 weeks or more. Anorexia is present in 60-80% of cases. Headache can be transient or even absent. Insidious personality changes may occur. Low grade fever then develops, and cranial nerve palsies may occur. Seizures occur in about 50% of children and 55% of adults. Delirium can occur. CSF pressure is increased. Lymphocytosis is seen, about 100-1000 cells/mm^3. Protein is elevated, sugar and chloride are reduced. TB bacillus may be identified under microscopic examination or may be cultured from CSF. For brain imaging, MRI is preferable in a case of TB meningitis. Without treatment, progressive hydrocephalus leads to death in a decerebrate rigidity state. On recovery with treatment, retrograde amnesia may be seen, which can extend for a period of months or years prior to the illness (David A. Lishman, 2009).

Without treatment, mortality rates in tuberculosis in general are high. Around 70% died within 10 years in case of sputum/smear positive and HIV negative cases, while around 20% died within 10 years in case of smear negative and culture positive cases.

Diagnosis is usually by sputum microscopy for AFB (acid fast bacilli) and chest X-ray. Other techniques include nucleic acid amplification technology, mycobacterial culture, computed tomography and magnetic resonance imaging.

Treatment of tuberculosis is through standard regimens. First line drugs are Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Ethambutol (E) and Streptomycin (S). Second line drugs are Ethionamide, Prothionamide, Cycloserine, Trizidone, Para-aminosalicyclic acid, Rifabutin, Thiacetazone, Ofloxacin, Levofloxacin, Moxifloxacin, Ciprofloxacin, Kanamycin, Amikacin and Capreomycin. Treatment includes an initial phase and a continuation phase. Category I regimen is as follows: H, R, Z and E for 2 months (initial phase), then H and R for 4 months (continuation phase). It is employed in new smear- or culture-positive cases and new culture-negative cases. Category II regimen is as follows: H, R, Z, E and S for 3 months (initial phase) and H, R and E for 5 months (continuation phase). Most cases of multi-drug resistance tuberculosis (MDR-TB) require 20 months of treatment with second-line drugs (Fauci AS, 2008).

THE INTERACTION OF PHYSICAL AND PSYCHIATRIC MORBIDITIES:

Psychiatric and physical diseases or disorders can influence each other through many mechanisms. One is through direct actions on physiological systems like neuroendocrine and immune systems. Another is through health behaviour. Patients with chronic diseases have multiple burdens like pain, reduced quality of life, premature death, financial costs and emotional trauma to the family members. Mood disorder has a lifetime prevalence of 8.9% to 12.9% and a six month prevalence of 5.8% to 9.4% in chronic diseases. About

20% of patients with physical disease suffer from major depression. It is a known fact that, sometimes, it may be difficult to determine if a somatic symptom is associated with the physical illness or the psychiatric illness (Lustman, P. J. 1995, Lustman, P. J. 2000, DiMatteo, M. R. 2000).

Adherence rate for long term medications is estimated to be about 50%. That is, about half of patients supposed to take drugs on term for physical illnesses, stop taking them. Depression has an important role in this behaviour. Studies have found that depression is associated with poor adherence rate with medications for physical illnesses. Patients with depression were found to be three times more likely to have poor adherence than those without depression. Moreover, treatment of depression and anxiety in patients with physical illness can lead to better outcomes regarding their physical illness. This has been observed in patients with diabetes in various studies. Substance use has also been associated with poor compliance with treatment (Doherty, A. M., 2013).

The association of tuberculosis and psychiatric disorders has been subject to statistical study since about 1863 (Pachi A, 2013). Deaths from tuberculosis in an asylum in Edinburgh was analysed and a question arose as to whether the living conditions in the asylum were responsible for tuberculosis or whether there was a special relationship between the two conditions. Later, studies in New York emphasised the role of the contagious factor. Actually, the high incidence of tuberculosis in patients with psychiatric illnessess was once supposed to be perhaps because tuberculosis can cause psychiatric illnesses or

psychiatric illnesses may strongly predispose to tuberculosis (Fantl K., 1950). Tuberculosis and psychiatric disorders may share many common risk factors like homelessness, HIV positive status, alcohol or substance abuse and migrant status. TB is also associated with negative outcomes when there is a major depressive episode present at baseline (Ugarte-Gil, C., 2013). Non-adherence to treatment is considered as the principal hurdle in eliminating TB (Prince, 2007).

India faces many challenges against controlling tuberculosis including poor functioning of general health services, a large and mostly unregulated private sector with inconsistent quality, poor socioeconomic development, poor effectiveness from the side of the State, difficulty in ensuring the quality of drugs and difficulty in establishing patient friendly services (Khatri GR, 2002).

EPIDEMIOLOGY OF TUBERCULOSIS:

Tuberculosis ranks alonside human immunodeficiency virus (HIV) as a leading cause of death due to an infectious disease. Global estimates by the WHO state that there were 9.6 million new cases in the year 2014. HIV positive incident TB cases were 1.2 million. Prevalence of TB was 13 million. About 1.2 million of the 9.6 million incident TB cases in 2014 were HIV positive. Mortality was recorded in 1.1 million cases in those with TB without HIV, and in 0.39 million in those with TB and HIV. Worldwide, 3.3% of new TB cases and 20% of re-treatment TB cases are MDR-TB. The number of deaths among HIV negative children with TB was 81,000, which is 7% of the

total HIV negative TB moratality. In addition to all this, a study says there is increased adulthood mortality in infants isolated at birth due to TB in family, with relative mortality rate higher in the group than a reference group for all causes of death and especially for unnatural deaths (Veijola JM, 2003).

These are the standard definitions used to describe certain TB related events.

- A 'bacteriologically confirmed TB case' is one from whom a biological specimen is positive by smear microscopy, culture or WRD (WHO approved Rapid Diagnostics) - such as Xpert MTB/RIF, which can identify Mycobacterium Tuberculosis DNA (MTB) and Resistance to Rifampicin (RIF).
- A 'clinically diagnosed TB case' is one who does not fulfill the criteria for bacteriological confirmation, but has been diagosed with active TB by a clinician who has decided to give the patient a full course of TB treatment. It includes diagnoses on the basis of X-ray abnormalities or suggestive histology and extra-pulmonary cases without laboratory confirmation.
- 'Pulmonary tuberculosis' refers to any bacteriologically confirmed or clinically diagnosed case of TB involving the lung parenchyma or the tracheobronchial tree. A patient with both pulmonary and extrapulmonary TB should be classified as a case of pulmonary TB.
- 'Extrapulmonary tuberculosis' is any bacteriologically confirmed or

clinically diagnosed case of TB involving organs other than the lungs.

- 'Relapse' is patients who have previously been treated, were declared cured or treatment completed at the end of their most recent course of treatment, and now are diagnosed with a recurrent episode of TB (either a true relapse or a new episode of TB caused by reinfection).
- 'Treatment failed' is when a patient who has a sputum smear positive for acid fast bacilli after 5 or more months of treatment.
- 'Treatment after failure' : patients who have previously been treated for TB and whose treatment failed at the end of their most recent course of treatment.
- 'Cured' is when a patient who initially had a positive sputum smear for acid-fast bacilli has completed treatment and has a negative sputum smear in the last month of treatment and on at least one previous occasion.
- 'Defaulted' is when a patient's treatment is interrupted for 2 or more consecutive months.
- 'Multidrug resistance (MDR-TB)' : resistance to at least both isoniazid and rifampicin.
- 'Extensive drug resistance (XDR-TB)' : resistance to any fluoroquinolone and to at least 1 of 3 second line injectable drugs (capreomycin, kanamycin and amikacin), in addition to multidrug resistance.

- 'Rifampicin resistance' : resistance to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs.
- 'Lost to follow up' : A TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more. The term 'lost to follow up' has replaced the term 'defaulter' to avoid judgemental language (WHO, Definitions and reporting framework for tuberculosis, 2013).

Resistance to drugs used in TB is a threat to the control of TB globally. It is a major public health concern in many countries. It is estimated that, about 3.3% of new TB cases and 20% of previously treated TB cases have multi drug resistant TB (MDR-TB). There were about 480,000 new MDR-TB cases and about 190,000 deaths from MDR-TB in 2014. About 9.7% of MDR-TB cases have extensively drug resistant tuberculosis (XDR-TB).

According to a study published in 2006, India and Russia alone accounted for about 62% of the estimated global MDR-TB burden in 2004 (Zignol M, 2006). India is one of the six countries with the largest numbers of incident cases in 2013, the others being China, Nigeria, Pakistan, Indonesia and South Africa. India has the largest incident of TB cases in the world. It accounts for about 1/5 of the global new TB cases, and 2/3 of the cases in Southeast Asia region. India is also one of the 22 high TB burden countries in the world, according to the WHO. It is also a high HIV burden and a high

MDR-TB burden country in the world. About 95% of all TB deaths globally in a year are from developing countries (Pachi A, 2013).

INDIAN STATUS REGARDING EPIDEMIOLOGY OF TUBERCULOSIS:

Incidence of TB in India in 2014 was 2.2 million. Prevalence was 2.5 million. HIV positive incident TB cases were 110,000. HIV negative TB mortality was 220,000 and HIV positive TB mortality was 31,000. About 2.2% of new TB cases and 15% of retreatment TB cases had MDR-TB. About 4% of TB patients were HIV positive, that is a total of 44,171. TB is the leading cause of infectious death in India (Khatri GR, 2002). About 220,000 people died of TB, and 31,000 died of TB+HIV in 2014 (WHO, Global tuberculosis report 2015). The city of Mumbai had a high proportion of MDR-TB strain – about 24% of previously untreated and 41% of treatment failure cases (D'souza DT, 2009). Treatment success rate among new and relapse cases registered in 2012 was 88%, among previously treated cases excluding relapse was 66%, among HIV positive TB cases was 76% and among rifampicin resistant (RR-TB)/MDR-TB was 46% (WHO, Global tuberculosis report 2015).

THE SOCIOECONOMIC IMPACT OF TUBERCULOSIS:

The socioeconomic impact of TB on families in India is also significant. Mean total cost was estimated in a study to be Rs.5986, with direct and indirect cost estimated to be Rs.2052 and Rs.3934 respectively. Mean work days lost due to TB was estimated to be 83. Mean debts due to TB was estimated to be

Rs.2079. Both rural and urban female patients had faced rejection by family. 11% of school children were estimated to have discontinued their studies and an additional had taken up employment to support their families (Rajeswari R, 1999). Tuberculosis is the leading contributor to global DALYs in 2012, among all infectious diseases (1.6% of total global DALYs) (WHO, DALY Global).

HIV AND TUBERCULOSIS:

HIV is one of the risk factors for developing tuberculosis. HIV/AIDS by itself is estimated to have lowered economic growth and reduced life expectancy by up to 50% in some countries. TB-HIV co-infection has been found to have a greater risk of common mental disorders (OR=1.7, 95% CI=1.1-2.9, $p<0.05$) (Deribew, A., T, 2010). HIV positivity was also associated with increased risk for extraulmonary TB (OR=4.93, 95% CI = 1.95-12.46) (Yang Z, 2004). HIV positive patients with TB tend to have poorer TB outcome compared to those without HIV. About 88% of patients with TB who were not HIV seropositive had good TB outcome, while only 73% of patients with TB who were HIV seropositive had good TB outcome. The proportion of TB patients who died during treatment was more than three times higher in those who were HIV positive compared to those who were HIV negative (11% vs 3.5%) (WHO, Global tuberculosis report 2015). In many countries, HIV/AIDS is considered even as a threat to national security (WHO, The World Health Report 2001).

PSYCHIATRIC MORBIDITY IN TUBERCULOSIS:

Prevalence of psychiatric disorders in tuberculosis has been estimated to be up to 70% in some studies (Doherty, A. M., 2013). A study in Nigeria, comparing patients with tuberculosis and patients with orthopedic problems and with a healthy control group, found that prevalence of psychiatric disorders was higher in the tuberculosis group than the other two - 30.2% in tuberculosis group vs 15% in orthopedic group and 5% in healthy control group (Aghanwa HS, 1998). Another study in Nigeria found the prevalence of depression to be about 45.5% among patients with TB (Lasebikan, V. O., 2015). A study in Philippines found that depressive state was observed in about 16.% of patients (Masumoto, S., 2014). Another study in Angola found a prevalence of 49.4% for depression (Xavier, 2015). A study in Taiwan found that depression had a 1.54 fold higher rate in TB group compared to the control group – 8.15 vs 5.29 per 1000 person-years (Shen, T. C., 2014). High rates of Common Mental Disorders were found in TB in various studies around the world – 80% in Pakistan, 64% in Ethiopia, 46% in South Africa and 26% in Nigeria (Peltzer, K., 2012). In a study in Zambia, prevalence of any anxiety disorder was found to be 30.8% and major depressive disorder was found to be 11% (van den Heuvel, 2013). Moderate or severe severe depression was found in about 49.2% of patients with TB in another study (Moussas, G., 2008). In a study in Pakistan, out of 65 patients, 47 (72%) had moderate or severe depression and anxiety (Aamir S, 2010). In another study in Pakistan,

prevalence of depression was found to be 46.3% (Lomachenkov, V. D., 1996).

Indian studies on psychiatric morbidity in TB have shown varying prevalence. In one study published in 2011, the prevalence of depression was found to be as high as 82% (Panchal SL, 2011). In another study, also published in 2011, out of 50 patients, 38 (76%) were found to meet the criteria for common mental disorders. Most common symptoms were hopelessness, sleeplessness and restlessness, with significant suicidal ideation in those patients (Chandra P, 2011). Various Indian studies since 1978 have studied psychiatric morbidity in tuberculosis. A study by Purohit (1978) in Udaipur found depression in 54.17% of patients with TB. The study had not studied other psychiatric disorders. Another study by Yadav (1980) in Agra found depression in 19.4% and anxiety in 6.6% of patients. The study considered only sputum positive TB patients. A case-control study by Tandon (1980) in Allahabad found depression in 32% patients with TB as compared to 7% in control group, and the difference was statistically significant (Chi square = 23.2, df = 2, $P<0.001$). Mathai (1981) in Trivandrum compared patients with TB against patients with bronchiectasis without TB and found that psychiatric morbidity was seen in 28.87% of patients with TB (15.7% - depressive neurosis, 7% - anxiety neurosis, and 3% alcohol dependence) and 7.14% in the brochiectasis group. The difference was statistically significant (Chi square = 10.96, df = 1, $P<0.001$) (Mathai, 1981). A study by Natani (1985) in Jaipur found that psychiatric morbidity in patients with TB had a prevalence of 70%

(G.D. Natani, 1985). A study by Meghnani in Jodhpur 1988 found a prevalence of 53.6% for depression (Meghnani ML, 1988). But they had excluded severe illness and patients taking certain anti-tubercular medicines, so the results may have less generalisability. Manoharam (2001) in Vellore found the prevalence of psychiatric morbidity in patients with TB to be 17.3%, with depression in 13.5% (Manoharam, E., 2001). But the study was done in primary care setup. A study by Prakash (2011) in Patna showed a prevalence of common mental disorders in TB to be 76%, with depression in 39.47% and generalised anxiety disorder in 13.15%. But the study had excluded those with past psychiatric illness (Pachi A, 2013).

ALCOHOL AND TUBERCULOSIS:

Alcohol use disorders, that is harmful use and dependence, have been estimated to have a prevalence of about 4.1% in the general population globally, according to a WHO analysis. The prevalence in males is about 7.2% and in females is about 1.3%. Alcohol is estimated to have a high rank as a cause of disease burden in general (WHO, Global status report on alcohol and health, 2014)). WHO estimates that alcohol use disorders are responsible for about 3.5% of all Disability Adjusted Life Years (WHO, DALY Global). Alcohol is also estimated to be responsible for about 5.9% of all deaths and 5.1% of the global burden of disease and injury in the year 2012 (WHO, Global status report on alcohol and health, 2014).

The prevalence of alcohol use disorders in India is estimated to be 2.6%.

For males, it is 4.5%, and for females, it is 0.6% (WHO, Global status report on alcohol and health, 2014).

In tuberculosis, data point out that, alcohol use disorders have a prevalence rate ranging from 10% to 70% in studies done in countries like Australia, Canada, Russia, Switzerland and the USA. The pooled relative risk across all studies that had a cut off for alcohol use disorder as 40 g of alcohol per day was 3.50 (95% CI of 2.01-5.93). Some studies were suspected to have publication bias, and so a corrected calculation excluding such studies gave a pooled relative risk of 2.94 (95% CI of 1.89-4.59) (Lönnroth K, 2008).

It has been found that the risk of tuberculosis increases in people who drink more than 40 g of alcohol per day or who have alcohol use disorder. Excess alcohol use has been associated in a study with a positive sputum smear result (adjusted OR=1.23, 95% CI = 1.18-1.28) and also with death during treatment (adjusted OR = 1.16, 95% CI = 1.10-1.22) (Volkmann T, 2015). Alcohol use has also been independently associated with adverse drug reactions during TB treatment and with unsuccessful treatment (Przybylski G, 2014).

More importantly, simple screening instruments and delivery of evidence based intervention for alcohol use disorder has been associated with better TB outcomes (Mathew TA, Shields AL et al, 2009). But the problem is that only a few people with tuberculosis and alcohol use disorder get referred for de-addiction (Mathew TA, Yanov SA et al, 2008). Alcohol consumption has been found to be one of the risk factors for MDR-TB (Mulu W, 2015). Alcohol

use has also been associated with social marginalisation and drift, higher rates of TB reinfection, higher rates of defaults, higher rates of drug resistance, unfavourable course of illness and most destructive forms of TB (Rehm J, 2009).

Alcohol use has also been associated with altered pharmacokinetics in the body, as acute intoxication can inhibit microsomal enzymes, while chronic use can induce them. So, drug levels may rise during periods of intoxication and fall during sober periods. (Taylor D, 2015). Also, antitubercular drugs and antiretroviral drugs can have hepatotoxic effects which might add to the hepatotoxic effects of alcohol (Rehm J, 2009).

The explanations for increased incidence of tuberculosis in people who have alcohol use disorder are mainly two – one, the social mixing patterns in those people, and the other, the detrimental effect of alcohol in immune system in the body.

The social mixing pattern in people who use alcohol may be responsible for increased incidence of TB in such people, because it includes mixing with people in settings like bars, shelters for homeless, prisons and social institutions (Lönnroth K, 2008).

The respiratory tract is the largest epithelial surface area of the body. It is exposed continuously to airborne particles and organisms. Normal people are quite resistant to pulmonary infections. The normal host defence system includes innate and acquired defence mechanisms. Innate defences include

structural defences, phagocytosis by alveolar macrophages and the polymorphonuclear cells (PMNs). Structural defence is through the mucociliary blanket lining, which contains complex mucins, which traps the microorganisms. They are then cleared by the ciliary movements that propel them towards the oropharynx. Coughing is an important component, which clears large amounts of secretions. Particles less than 5 microns in diameter, like the mycobacteria, can bypass normal defences and enter the alveolar space. Lysozyme, complement proteins, immunoglobulins A and G, fibronectin, transferrin, lactoferrin, defensins, cathelicidins and collectins are among the substances normally secreted in response to microbes (Zhang P, 2002).

The effect of alcohol on immune system includes direct toxic effects and indirect effects through nutrition deficiency, malignancies, etc. This might add to the increased risk of TB associated with psychiatric disorders other than alcohol/substance use disorders. Animal studies suggest that alcohol impairs cell mediated immunity and the proper functioning of macrophages. Both the cell mediated immunity and the proper functioning of macrophages are necessary for defence against tuberculosis. Alcohol may inhibit tumour necrosis factor-alpha (TNF-alpha) response in the body, reduce the nitric oxide system response to mycobacterial infection, can inhibit granuloma formation, interleukin-2 (IL-2) production, interferon-gamma (IFN-gamma) production and CD4 helper T cells proliferation. Alcohol use may suppress macrophage funcion by affecting mobilisation, adherence, phagocytosis and superoxide

production. Alcohol may also decrease membrane expression of the GM-CSF receptor in macrophages. The ability of macrophage to present antigens to lymphocytes for proper immune function may also be suppressed.

In addition to the cytokines mentioned above, alcohol may also impair the production of interleukin-6 (IL-6), interleukin-1beta (IL-1beta) and interleukin-8 (IL-8). Monocyte functioning is also interfered with and the capacity to produce cytokines is impaired. Cytokines play an important role in immune functions against bacteria and also in maintenance of proper cellular communication, and in regulation of inflammation and healing mechanisms. Antigen specific T cell activation may be impaired resulting in Th2 population (humoral immunity) dominating the Th1 population (cell mediated immunity). Cell mediated immunity is responsible for containing TB bacillus (Rehm J, 2009). Alcohol also impairs PMN cells' response to chemoattractants. Production of interleukin-10 (IL-10) is increased, which might be one of the mechanisms underlying the immunosuppresive effects of alcohol (Zhang P, 2002).

In addition to the above effects, alcohol use may also be associated with increased incidences of aspiration of oropharyngeal contents that may destroy normal protective barriers in the respiratory system, nutritional deficiencies and hepatic disease – all of which may interfere with normal immune functioning (Rehm J, 2009).

Alcohol use has also been found to be a risk factor for non-adherence to

treatment in tuberculosis (medium risk for alcohol misuse: OR = 1.74, 95% CI = 1.42-2.19, p<0.001; high risk for alcohol misuse: OR = 2.42, 95% CI = 1.76-3.32, p<0.001) (Naidoo, P., 2013).

SMOKING AND TUBERCULOSIS:

Smoking in previous studies has been defined as having ever smoked for at least 1 year. In a study published as early as 1956, it was found that, compared to controls, in people with tuberculosis who were above 30 years of age, there was significant deficiency of non-smokers and light smokers, and an excess of moderate and heavy smokers (Lowe CR, 1956). In a study done in South Africe, 2401 individuals, 1309 were current or ex-smokers and 1092 were never smokers. 82% of the smokers and 70% of the never-smokers had a positive Tuberculin Skin Test. The unadjusted Odds Ratio was 1.99 (95% CI = 1.62 to 2.45) (Gajalakshmi V, 2003). In another study done in Taiwan, presence of current smoking was found to be associated with a two fold risk of active tuberculosis (adjusted OR = 1.94, 95% CI = 1.01-3.73) (Lin HH, 2009). In another study done in Spain, which was a case-control study, it was found that there was a significant association between active smoking (occasional or daily) and tuberculosis. Odds ratio was 3.65 (95% CI = 1.46 – 9.21, p <0.01). Daily smoking was associated with tuberculosis with an Odds ratio of 3.53 (95% CI = 1.34 – 9.26, p <0.05) (Alcaide J, 1996). In another study in Shangai, the relative risk of tuberculosis in heavy smokers compared to non-smokers was found to be about 2.17 (95% CI = 1.29 – 3.63). The study also found that

male sex and old age was more associated with tuberculosis (Yu GP, 1988). The relative risk for death from tuberculosis in smokers has been estimated to be about 4.5 in one study (Gajalakshmi V, 2003).

Prevalence of smoking in India is about 24.3% in males and 2.9% in females (WHO report on the global tobacco epidemic, 2015). A large Indian case-control study compared respiratory and other diseases in smokers and non-smokers in urban and rural areas. In urban areas, risk of death due to tuberculosis was higher among the smokers than non-smokers (RR = 4.5, 95% CI = 4.0-5.0). Relative risk for death from other diseases was found to be 1.8 (95% CI = 1.7-1.9) for vascular disease and 2.1 (95% CI = 1.9-2.4) for cancer. Death from a medical cause in general was found to have a relative risk of 2.1 (95% CI = 2.0-2.2). In the rural areas, the study findings did not differ significantly from the urban findings. The relative risk for mortality from tuberculosis among smokers compared to non smokers was 4.2 (95% CI = 3·7–4·8). For deaths from vascular diseases, the relative risk was 1.7 (95% CI = 1·6–1·9) and for deaths from neoplastic disordes, the relative risk was 2.5 (95% CI = 2.0-3.1). The risk was significant for both cigarettes and bidis. TB and other respiratory diseases were thus found to account for a significant proportion of all smoking associated mortality. It was concluded that smoking probably increases the incidence of clinical disease by converting chronic subclinical infection to clinical disease. A dose response relationship was found in the study between smoking and clinical disease (Gajalakshmi V, 2003).

In another case-control study done in India, the association between smoking cigarettes/beedis and tuberculosis was found to have an estimated OR of 2.48 (95% CI = 1.42-4.37; P<0.001). The relationship was still significant after adjustment for age (OR = 2.24, 95% CI = 1.27-3.94) (Kolappan C, 2002).

In studies, a positive association has been observed between the number of pack years and tuberculosis. People who smoked more then 15 pack years were found to have the highest risk (Den Boon S, 2005). Positive relationship was also observed in another study. Smokers had been categorised based on the mean number of cigarettes smoked per day - mild (1-10), moderate (11-20) and heavy (>20). The odds ratios were 1.75, 3.17 and 3.68 for mild, moderate and heavy smokers respectively (p<0.0001) (Kolappan C, 2002).

Association between passive smoking and tuberculosis had a crude OR of 5.59 (95% CI = 2.7-15.10; p<0.001), but it became insignificant when adjusted for age, gender and socio-economic status (OR = 2.5, 95% CI = 1-6.2) (Alcaide J, 1996). In a meta-analysis, it was found that second hand smoke was associated with a higher risk of TB infection, but this did not reach statistical significance (RR = 1.19, 95% CI = 0.90-1.57). But the association between second hand smoke was significantly associated with risk of TB disease (RR = 1.59, 95% CI = 1.11-2.27) (Dogar OF, 2015).

The exact mechanism by which smoking increases the risk of tuberculosis is not clear, but it may be through damage to the pulmonary host defences. Smoking reduces natural killer cells, suppresses T cell function in

lungs and in blood, impairs mucociliary clearance and increases the number of alveolar macrophages in the lower respiratory tract. The macrophages eliminate mycobacteria and cigarette smoke impairs their function and may result in persistence and replication of mycobacteria (Sopori M, 2002).

Treatment outcome has also been found to be poor in people who smoke. In a study done in Pakistan, it was found that smoking was statistically associated with poor treatment outcome as assessed by smear testing at the end of treatment (OR = 2.58, 95% CI = 1.32-5.03, p = 0.004). 79.4% of those who smoked had an unsuccessful outcome, while only 20.6% had successful outcome. The study also found that smoking was more associated with pulmonary tuberculosis than extrapulmonary tuberculosis (p = 0.05) (Khan AH, 2015).

Smoking has been found to be associated with non-adherence in TB treatment (OR = 2.09, 95% CI = 1.76-2.49; p<0.001). Other factors that were associated with non-adherence include male gender, medium and high levels of poverty, severe psychological distress, medium and high risk of alcohol misuse (Naidoo, P., 2013).

ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC AND OTHER FACTORS AND PSYCHIATRIC MORBIDITY IN TUBERCULOSIS

The association between various demographic and disease related factors have been studied in past studies. The results have been mixed for many factors. For age, one study found no significant association with psychopathology, using the General Health Questionnaire (chi squared = 2.123, df = 3, p>0.05) (Aghanwa HS, 1998). Another study found that age >/= 65 was more associated with depression than age<50 (aHR = 1.34, 95% CI = 1.16-1.55). Severity of depression was found to be positively associated with older age (p=0.002) (Olusoji Mayowa Ige, 2011). Depression, in another study, was significantly associated with age (Pearson r=0.20, p<0.05), but anxiety was not (Pearson r =0.13, p=0.14) (Moussas, G., 2008).

For gender, one study found no significant association (chi squared = 0.01, d.f. = 1) (Mathai, 1981). Another study also found no significant relationship between gender and psychopathology (Chi squared = 0.143, df=1, p>0.05) (Aghanwa HS, 1998). But other studes have found significant relationships, some for male and others for female gender. Depression prevalence was more in females than in males (aOR = 1.42, 95% CI = 1.28-1.57) in one study (Shen, T. C., 2014). Another study found positive relationship between depression score and female gender (t-test, p<0.05) (Moussas, G., 2008). Another study also found significant relationship between female gender and depression levels (OR = 1.722, 95% CI = 1.148-2.582), and

also between female gender and emotional distress (OR = 1.55, 95% CI = 1.024-2.346) (Xavier, 2015). One study found male gender was more associated with psychosis in tuberculosis (chi square = 9.9, p=0.002) (Lasebikan, V. O., 2015).

Relationship with religion was examined in one study in Nigeria, and no significant relationship was observed with level of psychopathology (chi-squared = 1.327, df = 1, p>0.05, not significant) (Aghanwa HS, 1998).

Education status had no significant association with psychiatric illness in TB in one study (chi squared = 0.23, df = 1, not significant) (Mathai, 1981). But one study found a significant relationship between low education and psychological distress (OR = 0.77, 95% CI = 0.65-0.91) (Peltzer, K., 2012). Another study also found a significant relationship between low education (up to primary) and psychopathology (chi squared = 5.14, df = 1, p<0.05) (Aghanwa HS, 1998).

Regarding occupation, one study no significant relationship with psychopathology (chi squared = 2.53, df = 3, p>0.05) (Aghanwa HS, 1998). In another study, day labourers were found to have an increased risk for common mental disorders (OR = 2.4, 95% CI = 1.2-5.1) (Deribew, A., T, 2010).

With financial status or income, mixed results have been observed. Some studies have found no significant relationship - chi squared = 0.23, dt = 2, not significant (Mathai, 1981), chi-square = 0.485, df=2, p>0.05 (Aghanwa HS, 1998). But a few others have observed a significant relationship – poverty

(OR = 2.02, 95% CI = 1.50 – 2.70) (Peltzer, K., 2012), low monthly income (aOR = 1.29, 95% CI = 1.11-1.49) (Shen, T. C., 2014), and no source of income (OR = 1.7, 95% CI = 1.1-2.8) (Deribew, A., T, 2010).

Mixed results have been observed regarding relationship between marital status and psychiatric disorders in TB. No significant relationship was observed in two studies – chi squared = 0.20, df = 1, not significant (Mathai, 1981), chi squared = 1.28, df = 3, $p>0.05$ (Aghanwa HS, 1998). However, significant association has been observed between being unmarried ($p=0.02$) (Olusoji Mayowa Ige, 2011)) and being in cohabitation compared to being married (aOR = 3.34, 95% CI = 1.52-7.37, $p=0.003$) (Masumoto, S., 2014) with psychiatric illnesses.

Nuclear family, as opposed to extended family, was found to be significantly associated with severity of depression in tuberculosis in one study ($p=0.01$) (Olusoji Mayowa Ige, 2011).

Relationship between sputum positivity in tuberculosis and psychiatric disorders has been studied in past studies. One study found a significant association with sputum positivity (chi squared = 3.86, df=1, $p<0.05$) (Mathai, 1981), while another found no significant association (OR = 1.12, 95% CI = 0.72-1.74, $p=0.24$) (Masumoto, S., 2014).

One study found that there was no significant relationship between pulmonary/extra-pulmonary tuberculosis and severity of depression ($p=0.1$) (Olusoji Mayowa Ige, 2011). Another study found a statistically significant

relationship between extra-pulmonary tuberculosis and higher levels of depression (OR=1.714, 95% CI=1.236-2.377) and anxiety (OR=1.714, 95% CI=1.236-2.377) (Xavier, 2015).

Duration of illness has been associated with increased psychiatric morbidity in various studies. One study reported a positive relationship between severity of depression and duration of illness (p=0.03) (Olusoji Mayowa Ige, 2011). Another study also reported a relationship between time from diagnosis and depressive symptomatology (Pearson r=0.39, p<0.01) (Moussas, G., 2008).

Dyspnoea grade 3 or more has been associated with presence of depression in tuberculosis (aOR=2.84, 95% CI=1.32-6.12, p=0.008) (Masumoto, S., 2014).

Multi drug resistance has been found to be significantly associated with higher anxiety (OR=1.473, 95% CI = 1.012-2.142) and depression (OR=1.473, 95% CI = 1.012-2.142) levels (Xavier, 2015).

Regarding HIV-TB coinfection, one study found no significant relationship between HIV-TB co-infection and rates of common mental disorders (van den Heuvel, 2013). Another study also found no significant relationship between HIV-TB co-infection status and risk of common mental disorders (OR=1.7, 95% CI = 1.0-2.9) (Deribew, A., T, 2010).

Category 2 tuberculosis has been found to be significantly associated with severity of depression in one study (p=0.003) (Olusoji Mayowa Ige,

2011).

ANTI-TUBERCULAR DRUGS AND PSYCHIATRIC ADVERSE EFFECTS

Anti-tubercular drugs have been shown to be associated with development of psychiatric syndromes. Some anti-tubercular drugs have significant pharmacokinetic properties that may interfere with the blood concentrations of psychotropic drugs, while some psychotropic drugs also have significant pharmacokinetic properties that might alter blood concentrations of anti-tubercular drugs.

Isoniazid, in combination with other anti-tubercular drugs, has been found to be associated with development of psychosis. Changes in sleep rhythm, insomnia, memory impairments, headache, euphoria, agitation, anxiety and somnolence have been described with isoniazid. Pyridoxine deficiency observed with isoniazid may have a role in the pathogenesis of psychosis (Pachi A 2013, Theron G 2015, Alao AO 1998, Prasad R 2008).

Ethionamide has been found to be associated with anxiety, depression and psychosis. Rates of psychiatric disorders increase with increased duration of treatment.

Ethambutol has been associated with dizziness, disorientation, auditory and visual hallucinations (Pachi A, 2013). The incidence of depression in patients who were on higher doses of ethambutol was higher (aHR=2.54, 95% CI=1.19-5.45). The effect was also dose dependent (Yen YF, 2015).

Fluoroquinolones also have been found to be associated with psychosis, depression, suicidal ideation, delirium and nightmares (Pachi A, 2013). Ciprofloxacin has been implicated in development of acute psychosis (Norra C, 2003).

Cycloserine is another anti-tubercular drug that has also been reported to be associated with neuropsychiatric disturbances including hallucinations, anxiety, depression, euphoria and suicidal ideas or attempts (Pachi A 2013, Doherty A. M. 2013). Cycloserine induced mania has been reported in literature (Bakhla A, 2013). Cycloserine induced psychosis has also been reported (Sharma B 2014, Tandon VR 2015).

Reports of psychosis can be found for most anti-tubercular drugs (Doherty, A. M., 2013).

PHARMACOKINETIC INTERACTIONS

Isoniazid is a potent inhibitor of CYP2C19 and CYP3A in a concentration dependent manner. Isoniazid also inhibits CYP2D6 competitively and CYP2E1 non-competitively. Isoniazid, therefore, may increase the blood levels of other drugs metabolised by these enzymes. Rifampicin is a microsomal enzyme inducer and may reduce the blood levels of other drugs and make them less effective. Instances of toxicity have been reported in withdrawal of rifampicin, due to sudden removal of enzyme inhibition (Bebchuk JM, 1991).

Among antidepressants, all selective serotonin reuptake inhibitors

(SRRIs) appear to be metabolised by cytochrome p450 enzymes, but interactions of each drug are variable. The principal enzyme that metabolises fluoxetine is not clear, but CYP2D6 and CYP3A3/4 are thought to be involved. Fluoxetine inhibits CYP2D6, CYP2C9/10, CYP3A3/4 and CYP1C19. Fluoxamine potently inhibits CYP1A2. It also inhibits CYP2C19 and CYP3A3/4. Paroxetine is mainly metabolised by CYP2D6. Paroxetine has been said to be the safest SSRI for use with isoniazid (Trenton AJ, 2001).

DRUG NON-ADHERENCE

Medication non-adherence is a recognised factor that hinders successful management of tuberculosis. Non-adherence leads to drug resistance (Paramasivan CN. 1998), which then necessitates the use of second line drugs which are associated with relatively more adverse effects. HIV-TB co-infection has also found to be associated with increased risk for drug resistance (Yang Z, 2004). Smoking during treatment has been found to be associated with non-adherence (adjusted prevalence OR=7.8, 95%CI=1.2-4.9). Alcohol use has also been found to be associated non-adherence (adjusted prevalence OR=3.6, 95%CI=1.5-8.3). Age, gender, marital status, religion, literacy and employment status were not associated with non-adherence (Bagchi S, 2010).

Summarising, past studies show that tuberculosis is associated with significant psychiatric morbidity and that psychiatric morbidity in chronic medical conditions affect compliance and lead to poor outcome, which in the case of tuberculosis can be drastic with emergence of drug resistance.

Substance use disorders significantly increase the risk of tuberculosis disease, and also affect compliance with drug regimen.

MATERIALS AND METHODS

Our study is a cross sectional study conducted at Government Thiruvateeswarar Hospital for Thoracic Medicine, Otteri, Chennai, which is attached to the Government Kilpauk Medical College, Kilpauk, Chennai. A total of 106 consecutive patients fulfilling the inclusion and exclusion criteria were interviewed. Informed consent was obtained from those willing to participate.

All patients were diagnosis with tuberculosis by consultant chest physicians. A semi structured socio demographic proforma (Name, age, hospital no., gender, education, occupation, family income per month, marital status, type of family) and Kuppuswamy socioeconomic status scale (Kuppuswamy B. 1981) were applied to participants. Information regarding disease related factors like sputum positivity, presence of extrapulmonary TB, duration of illness, dyspnea grade [MRC breathlessness scale] (Stenton C., 2008), presence of MDR TB and XDR TB, H/O default, relapse or failure, presence of HIV coinfection, ATT drugs the patient is on, past history of psychiatric illness and family history of psychiatric illness were collected. Symptom Check List 90 (SCL-90) was used to screen patients. ICD 10 guidelines (WHO, The ICD-10 classification, 1992) were used for diagnosis of psychiatric disorders, Hamilton Depression rating scale (HAM-D 17) (Hamilton MA 1959) and Hamilton Anxiety rating scale (HAM-A) (Hamilton MA 1959) were used for assessing the severity of depressive and anxiety

disorders respectively. Fagerstorm nicotine dependence test score (Heatherton TF, 1991) and Alcohol Use Disorder Identification Test (AUDIT) (WHO The alcohol Use disorders identification test 2001) score were used to assess the severity of nicotine dependence and alcohol dependence respectively.

AIMS & OBJECTIVES

- To assess the prevalence of psychiatric illnesses in people undergoing treatment for tuberculosis.
- To assess the association between psychiatric comorbidity and different sociodemographic factors (age, gender, education) and disease related factors (duration of illness, grade of dyspnea in pulmonary TB, MDR-TB, HIV-TB coinfection).
- To assess the relationship between psychiatric comorbidity and negative behavioural factors like history of defaulting.

INCLUSION CRITERIA:

- Pulmonary or extrapulmonary TB or both, as diagnosed by a chest physician.
- Currently on treatment
- At least 1 month passed since initiation of treatment
- Age >/= 18 yrs
- Willing to participate in the study
- Able to co-operate for the interview

EXCLUSION CRITERIA:

- Patients who did not consent

TOOLS USED:

1. A semi structured socio demographic proforma (Name, age, hospital no., gender, education, occupation, family income per month, marital status, type of family).
2. Kuppuswamy socioeconomic status scale
3. Symptom Check List 90 (SCL-90)
4. The ICD 10 classification of Mental and Behavioural Disorders
5. Hamilton Depression rating scale (HAM-D 17)
6. Hamilton Anxiety rating scale (HAM-A)
7. Fagerstorm test for nicotine dependence (FTND)
8. Alcohol Use Disorder Identification Test (AUDIT)

ETHICAL APPROVAL

Ethical approval for the study was obtained from the Ethics committee, Government Kilpauk Medical College, Chennai.

HAMILTON DEPRESSION RATING SCALE:

The Hamilton depression rating scale was developed in the 1950s. It is a clinician administered scale and is one of the widely used scales in psychiatry. The scale was originally designed with 21 items. Later, 4 items (diurnal variation, de-realisation, paranoid symptoms and obsessional symptoms) were

dropped. Diurnal variation was considered as not being a measure of depression or its intensity. Others were considers as being infrequent. There are now 17 items in the scale, though the original 21 items version is also sometimes used. In this study, we used the 17 item version. The following are the items in the scale: depressed mood, feeling of guilt, suicide, insomnia early, insomnia middle, insomnia late, work and activities, retardation:psychomotor, agitation, anxiety (psychological), anxiety (somatic), somatic symptoms (gastrointestinal), somatic symptoms general, genital symptoms, hypochondriasis, loss of weight and insight. Each item is scored on a 3 to 5 point scale (0-2 to 0-4). Individual scores are later summed up to give a total score. The scale has been shown to be sensitive over a wide range of depression severity in studies. The inter-rater reliability for the scale has also been found to be good (0.82) (Cicchetti DV, 1983). Internal consistency of the scale was found to be 0.83. Validity of the scale ranges from 0.65 to 0.90 with global measures of severity of depression in studies. Validity also highly correlated with behavioural features, and somatic features account for about half of the total possible score in the scale. The maximum possible total score on the scale is 52. The scale is considered as a standard instrument in psychiatry. The average time for administration is about 12 minutes (Hamilton M 1960, Williams JB 1988, Carroll BJ 1973, Baer L 2010).

HAMILTON ANXIETY RATING SCALE

The Hamilton anxiety rating scale was designed to quantify anxiety in

patients already diagnosed with anxiety disorders. The scale was not intended to be a diagnostic tool. The scale was also not meant for use in disorders other than neurotic anxiety states. The scale contains 14 items and is clinician administered. It takes about 15 to 30 minutes to administer the scale. The individual items are: anxious mood, tension, fears, insomnia, intellectual, depressed mood, somatic (muscular), somatic (sensory), cardiovascular symptoms, respiratory symptoms, gastrointestinal symptoms, genitourinary symptoms, autonomic symptoms and behaviour at interview. Each item is scored on a 5 point scale (0 to 4). The scores are all added up to yield the total score. In addition to the total score, two sub-scales have been suggested – psychic subscale (items 1 to 6 and 14), and somatic subscale (items 7 to 13). The scale has been evaluated for reliability and has been found to have an inter-rater correlation of 0.89. Internal consistency ranges from 0.77 to 0.92. The scale has also demonstrated good 1 week test-retest reliability also (alpha=0.96) (Hamilton MA 1959, Maier W 1988, Baer L 2010).

FAGERSTROM TEST FOR NICOTINE DEPENDENCE

Fagerstrom test for nicotine dependence is a brief scale that can be used to measure nicotine dependence in a quantitative way. It is useful in predicting the severity of nicotine craving and withdrawal. It is actually a modification of another scale, the Fagerstrom tolerance questionnaire (FTQ), which had eight items. FTQ was criticised for poor validity, reliability and internal consistency. So, the Fagerstrom test for nicotine dependence was developed as a

modification of the FTQ. The Fagerstrom test for nicotine dependence has six items – how soon is the first cigarette smoked after waking up, does the person find it difficult to refrain from smoking in places where smoking is forbidden, which cigarette is most difficult for the person to stop, how many cigarettes one smokes in a day, is smoking more frequent during the first hours after waking up, and does the person smoke even if he is so ill that he is in bed most of the day. Total score is categorised as follows: 0-2: very low dependence, 3-4: low dependence, 5: moderate dependence, 6-7: high dependence, 8-10: very high dependence. Internal consistency has been estimated to be 0.64 (Cronbach's alpha = 0.68) (Baer L 2010, Pomerleau CS 1994, Heatherton TF, 1991).

ALCOHOL USE DISORDER IDENTIFICATION TEST

The alcohol use disorder identification test (AUDIT) was developed by the World Health Organisation as a simple method of screening for excessive drinking. It is one of the two scales recommended by the National Institute of Alcohol Abuse and Alcoholism (USA) for screening of alcohol related problems. It can be self administered or interviewer administered. It takes about 2-5 minutes to complete. There are 10 items in the scale that measure the following: 1) frequency of drinking, 2) typical quantity per day, 3) frequency of heavy drinking, 4) impaired control over drinking, 5) increased salience of drinking, 6) morning drinking, 7) guilt after drinking, 8) blackouts, 9) alcohol related injuries, 10) others concerned about drinking. Each item is scored from 0-4 and the total score is added up. There are three domains in the AUDIT –

hazardous alcohol use, dependence symptoms and harmful alcohol use. Items 1-3 assess hazardous alcohol use, 4-6 assess dependence symptoms and 7-10 assess harmful alcohol use pattern. A cut off of 8 for problematic drinking was found to have a sensitivity of around 0.90, and specificity of around 0.80 across countries. It has been found to be sensitive and specific to alcohol use disorder. It has been found to have good reliability and validity across countries and population subgroups. Cronbach's alpha for internal consistency was found to be around 0.80. A high correlation coefficient of 0.78 has been found between AUDIT and the CAGE questionnaire. It is also considered a useful tool for identifying people who would benefit from reducing their drinking even if they are not alcohol dependent. AUDIT score has been categorised in to four risk zones. Scores 0-7 fall in zone 1, scores 8-15 fall in zone II, scores 16-19 fall in zone III and scores 20-40 fall in zone IV (Baer L 2010, WHO The alcohol Use disorders identification test 2001, Allen JP, 1997).

KUPPUSWAMY SOCIOECONOMIC STATUS SCALE

Kuppuswamy socioeconomic status scale is a widely used scale to assess the socio-economic class of study participants. It was published in 1981 originally, but modifications have been published regularly to account for the changing price index. It has three categories to be scored – education level of the head of the family, occupation of the head of the family and income per month. Education is scored from 1-7, occupation from 1-10 and monthly family income from 1-12. The total is added up. There are five socioeconomic

classes that can be derived from the scale – upper (I), upper middle (II), middle/lower middle (III), lower/upper lower (IV) and lower (V). The scale needs modification from time to time because of the changing price index that affects the validity of the income per month subset in the scale (Kuppuswamy B 1981, Kumar BR 2012, Sharma R 2014, Patro BK 2012).

STATISTICAL ANALYSIS:

Statistical analysis was done using computer software, to assess the association between psychiatric comorbidity and different sociodemographic factors and disease related factors (duration of illness, grade of dyspnea in pulmonary TB, MDR-TB, HIV-TB coinfection), and to assess the relationship between psychiatric comorbidity and negative behavioural factors like history of defaulting. P value was taken to be significant if it was <0.05.

RESULTS:

A total of 111 patients were approached for the study. Of these, 2 patients did not consent to participate in the study and another 3 patients were acutely dsypnoeic, so were not included in the study. The remaining 106 patients consented to participate in the study. Informed consent was obtained from all these participants.

Of these 106 patients, 79.24% (n = 84) were males and 20.76% (n = 22) were females.

About 44.3% belonged to the age group 18-44 years, 50.94% to the 45-64 years group, and 4.71% to the 65 or more years group.

Majority (82.07%) belonged to Hindu religion, about 7.54% were Muslims, and 10.37% were Christians.

About 33.01% were illiterate, 22.6% had primary school level education, 33.96% had middle school level education, 9.4% had high school level education, and 0.94% had intermediate level education.

Majority (42.45%) were unemployed, 14.15% were unskilled workers, 25.47% were semi-skilled workers, and 17.92% were skilled workers. Twenty (90.90%) of the twenty-two females were unemployed, while 25 (29.76%) of the 84 males were unemployed.

Majority (51.88%) fell in the income group Rs. 4810-8009 per month, about 0.94% had income less than Rs.1600, 18.86% had income of Rs. 1601-4809, 19.8% had income of Rs.8010-12,019, and about 8.4% had income of

Rs.12,020-16,019.

Majority (88.67%) were from upper lower socio-economic status, 8.4% from lower middle, and 2.8% from lower socio-economic status. No one was from upper middle or upper socio-economic status.

About 67.9% were married and living with spouse, 7.5% were separated, 2.8% were divorced, 8.4% were widowed, and 13.2% were single. Majority were from nuclear families (64.1%), about 24.5% from joint families, and 11.3% from broken families.

SOCIO-DEMOGRAPHIC PROFILE OF THE STUDY POPULATION

S. No.	Socio-demographic variable		n	Percentage (%)
1	Age (years)	18-44	47	44.33
		45-64	54	50.94
		65 or more	5	4.71
2	Sex	Male	84	79.24
		Female	22	20.75
3	Religion	Hindu	87	82.07
		Muslim	8	7.54
		Christian	11	10.37
		Others	0	0
4	Education	Illiterate	35	33.01
		Primary school	24	22.6
		Middle school	36	33.96
		High school	10	9.4
		Intermediate/Post high school diploma	1	0.94
		Graduate/Post graduate	0	0
		Professional/Honours	0	0
5	Occupation	Unemployed	45	42.45
		Unskilled worker	15	14.15
		Semi-skilled worker	27	25.47
		Skilled worker	19	17.92
		Clerical, shop owner, farmer	0	0
		Semi profession	0	0
		Profession	0	0
6	Family income per month	</=1600	1	0.94
		1601-4809	20	18.86
		4810-8009	55	51.88
		8010-12019	21	19.81
		12020-16019	9	8.4
		16020-32049	0	0
		>/=32050	0	0

S. No.	Socio-demographic variable		n	Percentage (%)
7	Socio-economic status	Upper	0	0
		Upper middle	0	0
		Lower middle	9	8.4
		Upper lower	94	88.67
		Lower	3	2.8
8	Marital status	Single	14	13.2
		Married	72	67.9
		Widowed	9	8.4
		Separated	8	7.5
		Divorced	3	2.8
9	Type of family	Nuclear	68	64.1
		Joint	26	24.5
		Extended	0	0
		Broken	12	11.3

Figure showing various age groups of the study population

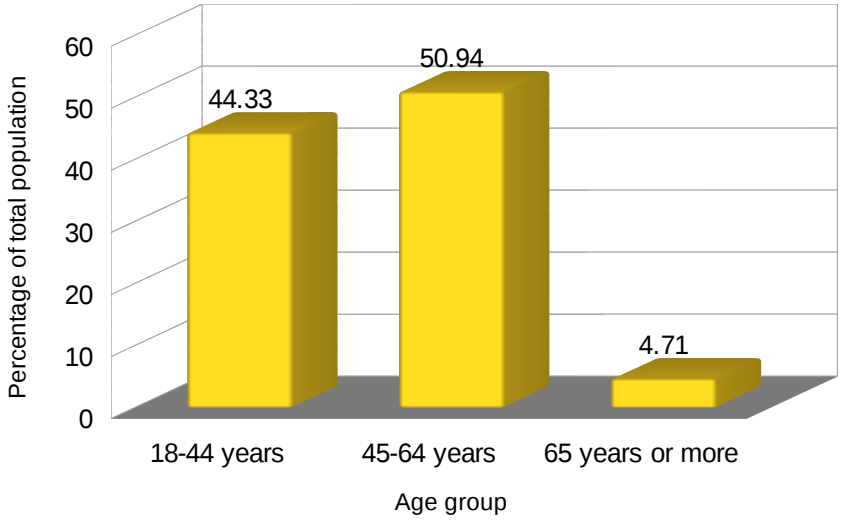
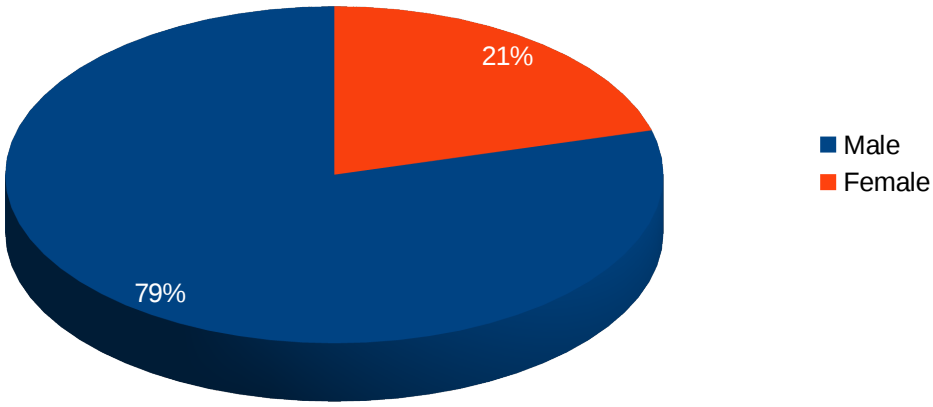


Figure showing male female ratio in the study populaion



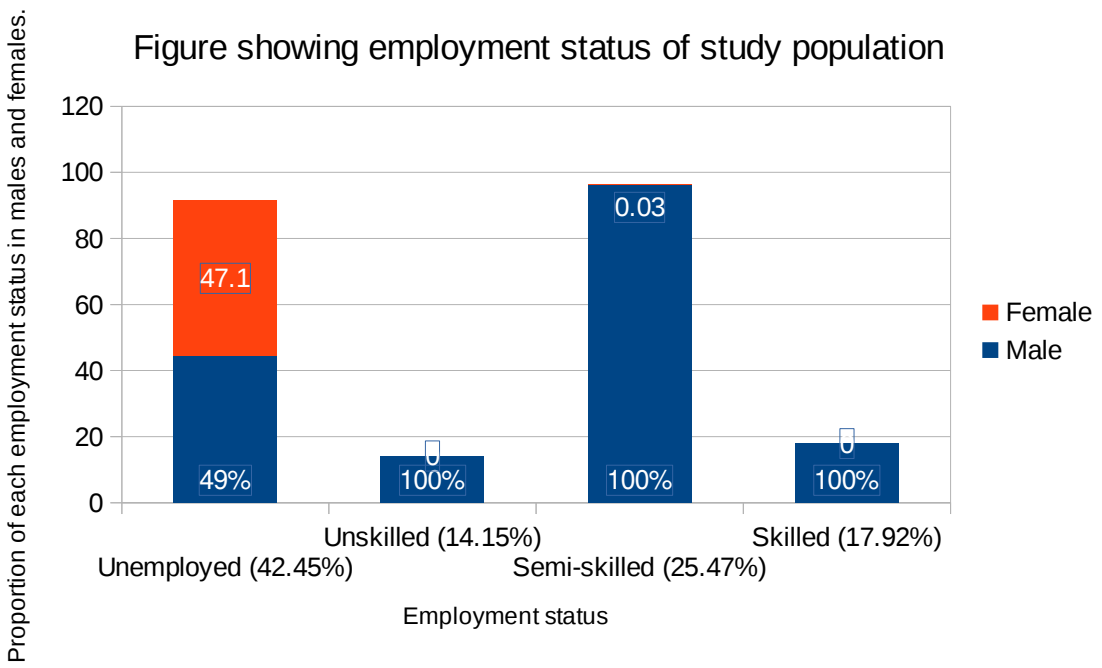


Figure showing employment status of study population
Proportion of each employment status in males and females.
120
100
80
60
40
20
0
47.1
49%
0
100%
0.03
100%
0
100%
Unemployed (42.45%)
Unskilled (14.15%)
Semi-skilled (25.47%)
Skilled (17.92%)
Employment status
Female
Male

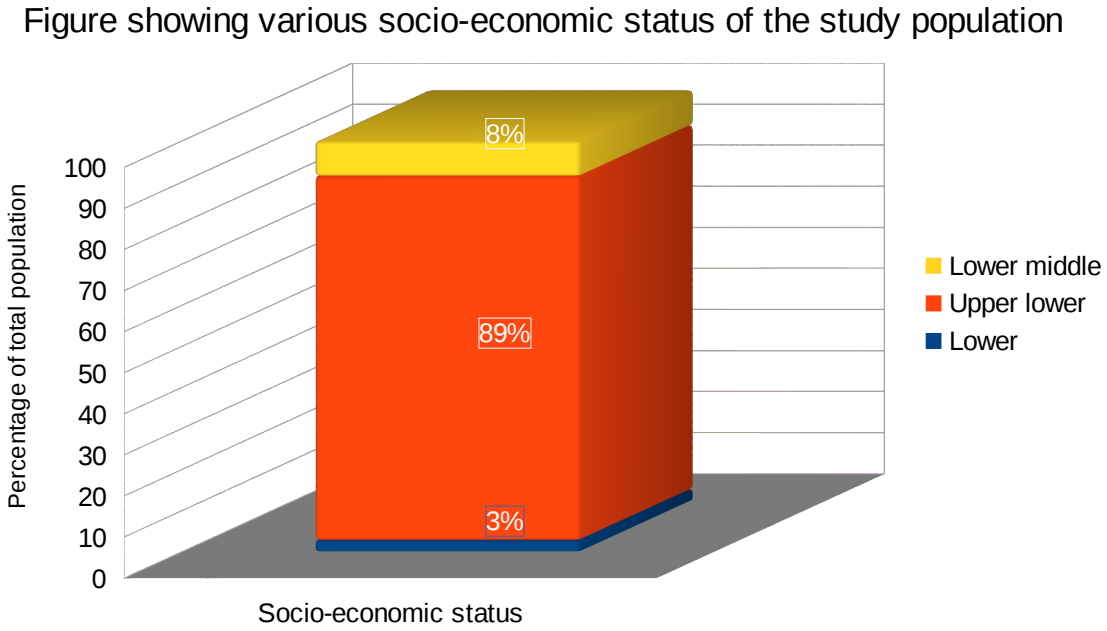


Figure showing various socio-economic status of the study population
Percentage of total population
100
90
80
70
60
50
40
30
20
10
0
8%
89%
3%
Socio-economic status
Lower middle
Upper lower
Lower

TUBERCULOSIS DISEASE RELATED FACTORS

Data regarding various tuberculosis disease related factors – were analysed. About 81.1% had sputum positive tuberculosis, while the remaining (18.86%) had sputum negative tuberculosis. Extra-pulmonary tuberculosis was present in about 2.8% of the study population, the rest had pulmonary tuberculosis.

Mean duration of tuberculosis was 5.7 months. About 83.9% had a duration of less than 1 year, while 16.03% had a duration of 1 year or more.

Clinically significant dyspnoea was present in about 83.01% of the study population. Among these, about 13.6% had grade I dyspnoea, 31.8% had grade II dyspnoea, 26.1% had grade III dyspnoea, 14.7% had grade IV dyspnoea, and 13.6% had grade V dyspnoea.

A history of default from ATT regimen was present in about 40.5% of the study population. A history of relapse of tuberculosis after successful course of ATT was present in about 15.09%. No one in the study population had a history of failure of anti-tubercular treatment.

HIV co-infection was present in about 4.7% (n=5). The rest 95.2% did not have HIV co-infection.

About half of the patients (n=53) were on Category I anti-tubercular regimen. The other half (n=53) were on Category II anti-tubercular regimen.

TUBERCULOSIS DISEASE RELATED FACTORS IN THE STUDY POPULATION:

S. No.	Tuberculosis disease related factors		n	Percentage (%)
1	Sputum positivity	Positive	86	81.1
		Negative	20	18.86
2	Extra-pulmonary tuberculosis	Present	3	2.8
		Absent	103	97.16
3	Duration of illness	<1 year	89	89
		>/= 1 year	17	17
4	Dyspnoea grade	1	12	13.6
		2	28	31.8
		3	23	26.1
		4	13	14.7
		5	12	13.6
5	History of default	Present	43	40.5
		Absent	63	59.4
6	History of relapse	Present	16	15.09
		Absent	90	84.90

S. No.	Tuberculosis disease related factors		n	Percentage (%)
7	History of failure of treatment	Present	0	0
		Absent	106	100
8	Presence of HIV co-infection	Present	5	4.7
		Absent	101	95.2
9	ATT regimen	Category I	53	50
		Category II	53	50

Figure showing sputum positivity and negativity in the study population

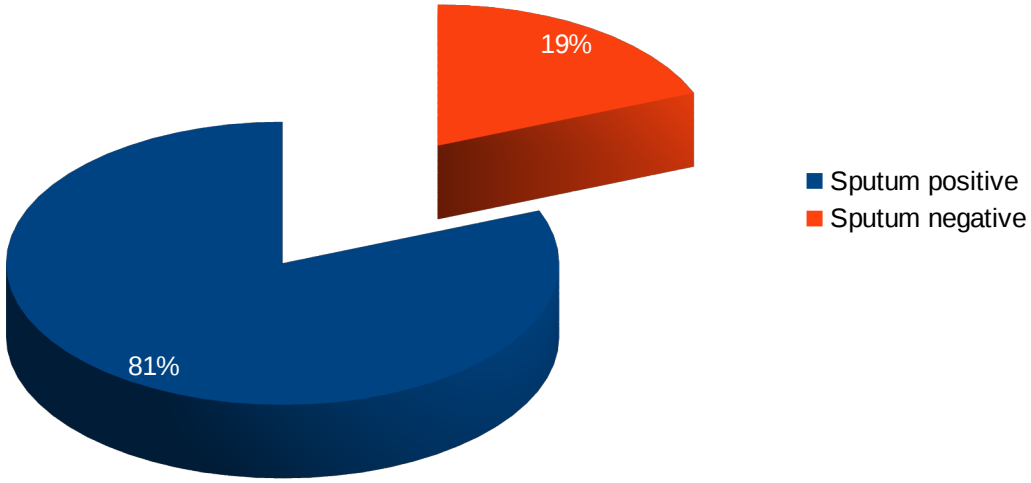
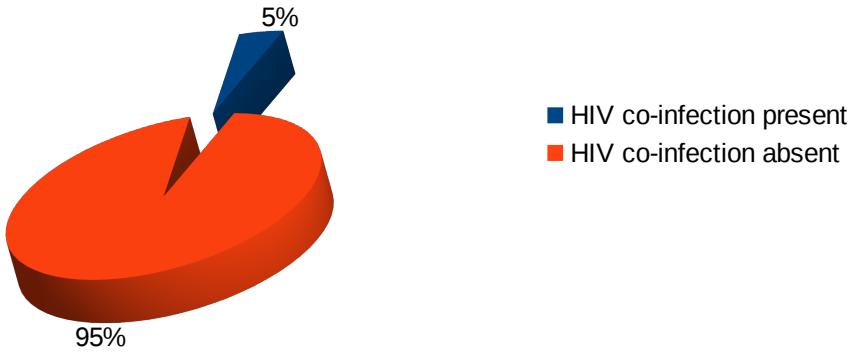


Figure showing HIV co-infection prevalence in the study population



MEDICAL CO-MORBIDITY IN THE STUDY POPULATION

Analysis of data regarding the presence of medical co-morbidities showed that, about 38.67% (n=40) had at least one medical co-morbidity. The most common medical co-morbidity was Type II Diabetes Mellitus. It was present in 28 people.

The next common co-morbidity was Chronic Obstructive Pulmonary disease, which was present in 4 people. Seizure disorder was present in 3 people. Two people had anaemia and two had pleural effusion.

Medical renal disease, coronary artery disease, gastritis, cerebro-vascular accident, chronic pancreatitis, hydrocele, diabetic nephropathy, corneal opacity and cholelithiasis were present in 1 person each.

Some patients actually had more than one medical co-morbidities.

Table 1: Medical co-morbidities in the study population.

S. No.	Medical co-morbidity in the study population	n
1	Type II Diabetes Mellitus	28
2	Chronic Obstructive Pulmonary disease	4
3	Seizure disorder	3
4	Anaemia	2
5	Pleural effusion	2
6	Medical renal disease	1
7	Coronary artery disease	1
8	Gastritis	1
9	Cerebro-vascular accident	1
10	Chronic pancreatitis	1

S. No.	Medical co-morbidity in the study population	n
11	Hydrocele	1
12	Diabetic nephropathy	1
13	Corneal opacity	1
14	Cholelithiasis	1

Figure showing prevalence of other medical co-morbidities

A total of 40 people had at least one another medical co-morbidity

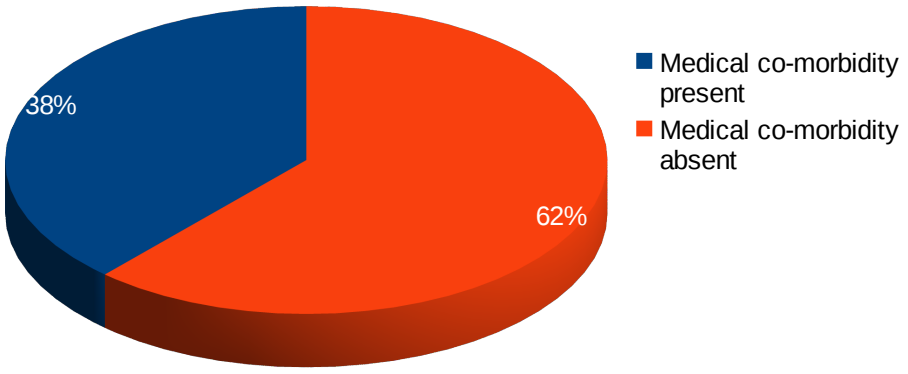
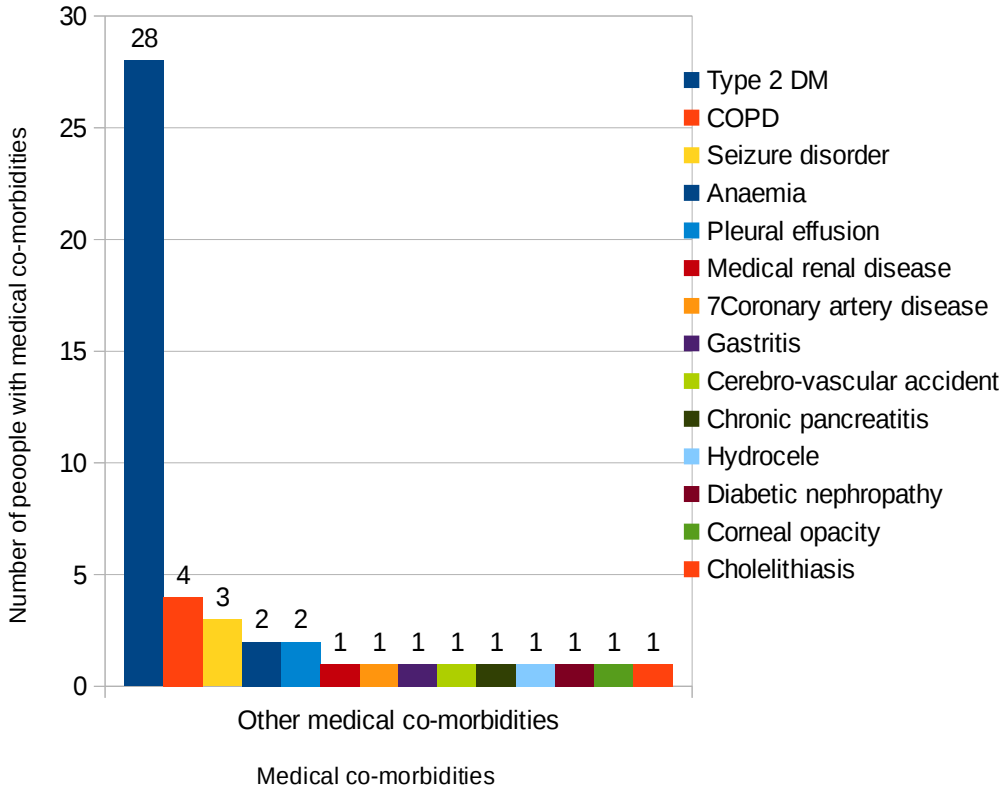


Figure showing various medical co-morbidities in the study population

40 people had medical co-morbidities. Some had more than one medical comorbidity.



PREVALENCE OF PSYCHIATRIC ILLNESSES IN THE STUDY POPULATION

Of the 106 people who participated in the study, 65 people (61.32%) had at least one psychiatric illness, excluding substance use disorders. When substance use disorders were included, the prevalence rate came to be 84.90% (n=90).

Depressive disorder was present in 66 (62.26%) people. Among these, majority (51.5%, n=34) had mild depressive disorder. Twenty-one (31.8%) had moderate depressive disorder, and 11 (16.6%) had severe depressive disorder.

Anxiety disorders were present in 25 (23.5%) patients. One had generalised anxiety disorder, while others were given a diagnosis of unspecified anxiety disorder as criteria, mostly duration criterion, were not fulfilled for other anxiety disorders. Among these, about 72% had mild anxiety and 28% had moderate anxiety as measured by Hamilton anxiety rating scale. Both depressive and anxiety disorders were present in 24 (22.64%) people. All but one who had anxiety disorder also had depressive disorder.

Regarding substance use, alcohol use and smoking were the disorders observed in the study population. Alcohol dependence syndrome was present in 63 (59.43%) people. Nicotine dependence syndrome (smoking) was present in 43 (40.56%) people. Thirty-seven (34.90%) had both alcohol and nicotine dependence syndromes.

Regarding severity of alcohol dependence, majority (53.9%) fell in the

risk zone 4 on AUDIT scores. About 1.5% fell in risk zone 1, 34.9% in risk zone 2, and 9.5% in risk zone 3.

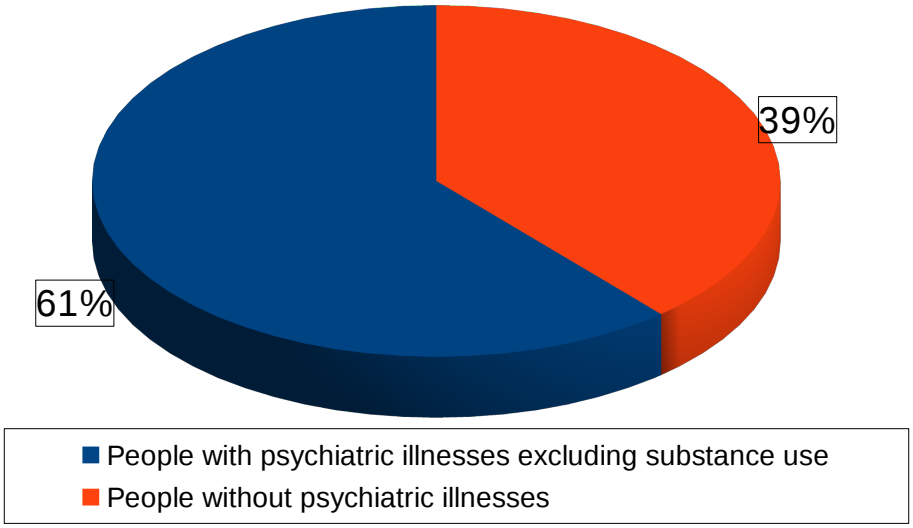
Regarding severity of nicotine dependence, majority (46.5%) had low dependence, while about 16.2% had high dependence, 2.3% had very high dependence, and about 34.8% had very low dependence, based on Fagerstrom test for nicotine dependence.

Data regarding past history of psychiatric illness were analysed. Data regarding past history of alcohol dependence syndrome and nicotine dependence syndrome, that is, those who had dependence in past, but were now abstinent for at least 12 months were also analysed. About 6.6% (n=7) had a past history of alcohol dependence, while about 7.5% (n=8) had a past history nicotine dependence. No other psychiatric illness was present in the past in the study population.

Regarding family history of psychiatric illness, about 45.2% (n=48) had a family history of psychiatric illness – alcohol dependence, nicotine dependence or both. No other psychiatric illness was present in the families of the study population.

S. No.	Psychiatric illness		n	Percentage (%)
1	Depressive disorder	Mild	34	51.5% of depression
		Moderate	21	31.8% of depression
		Severe	11	16.6% of depression
		Total	66	62.26% of total patients
2	Anxiety disorder	Mild	18	72% of anxiety
		Moderate	7	28% of anxiety
		Severe	0	0% of anxiety
		Total	25	23.5% of total patients
3	Both depressive and anxiety disorders		24	22.64% of total patients
4	Alcohol dependence syndrome	Risk zone I	1	1.5% of alcohol dependence
		Risk zone II	22	34.9% of alcohol dependence
		Risk zone III	6	9.5% of alcohol dependence
		Risk zone IV	34	53.9% of alcohol dependence
		Total	63	69.43% of total patients
5	Nicotine dependence syndrome	Very low	15	34.8% of NDS
		Low	20	40.67 of NDS
		Medium	0	0 of NDS
		High	7	16.27 of NDS
		Very high	1	2.3 of NDS
		Total	43	40.56% of total patients
6	Both alcohol and nicotine dependence syndromes		37	34.90% of total patients
7	Past history of psychiatric illness		12	11.3% of total patients
8	Family history of psychiatric illness		48	45.2% of total patients

Prevalence of psychiatric illnesses excluding substance use disorders



Prevalence of psychiatric illnesses including substance use disorders

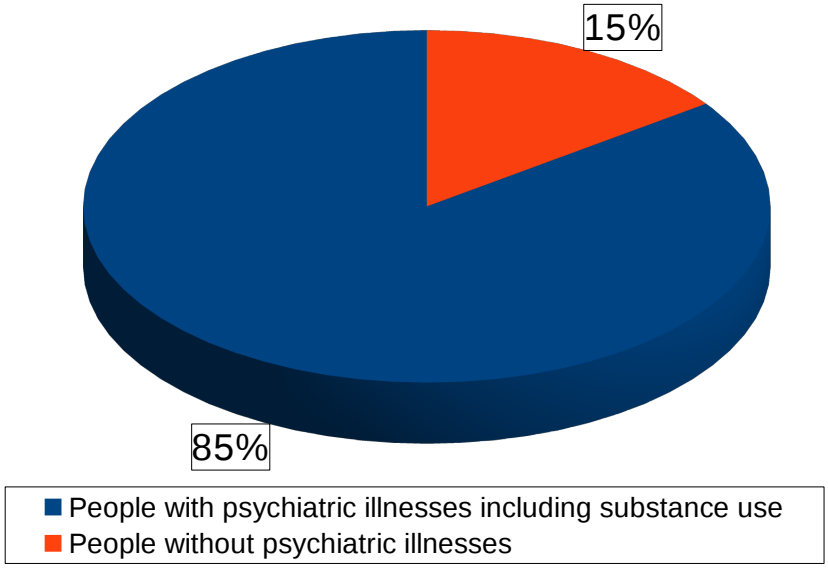
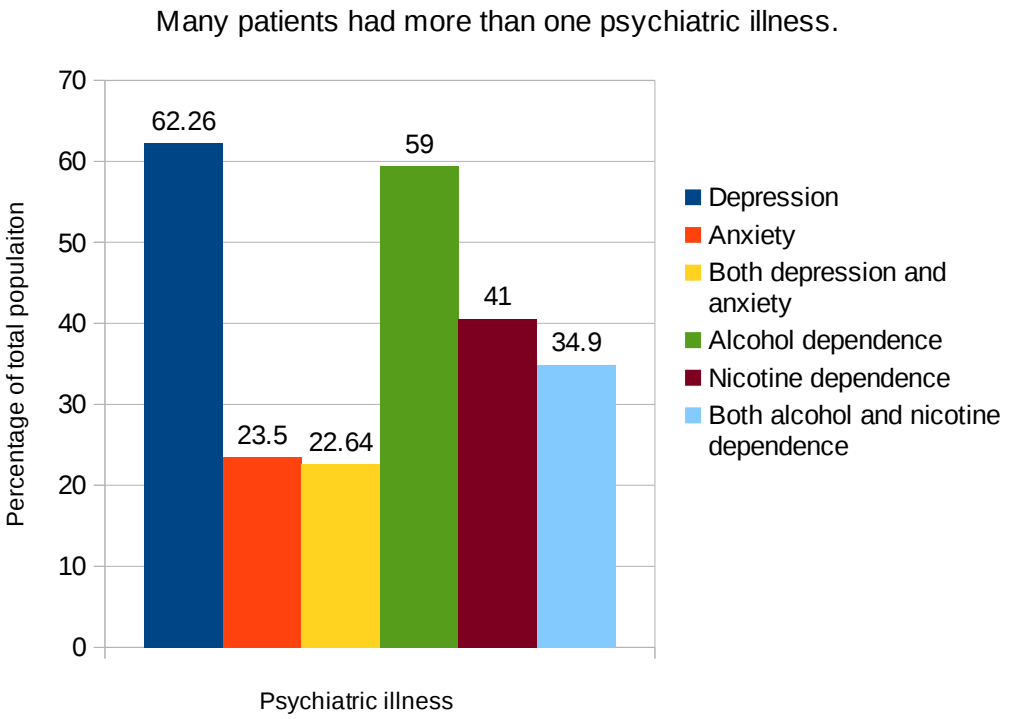


Figure showing prevalence of various psychiatric illnesses



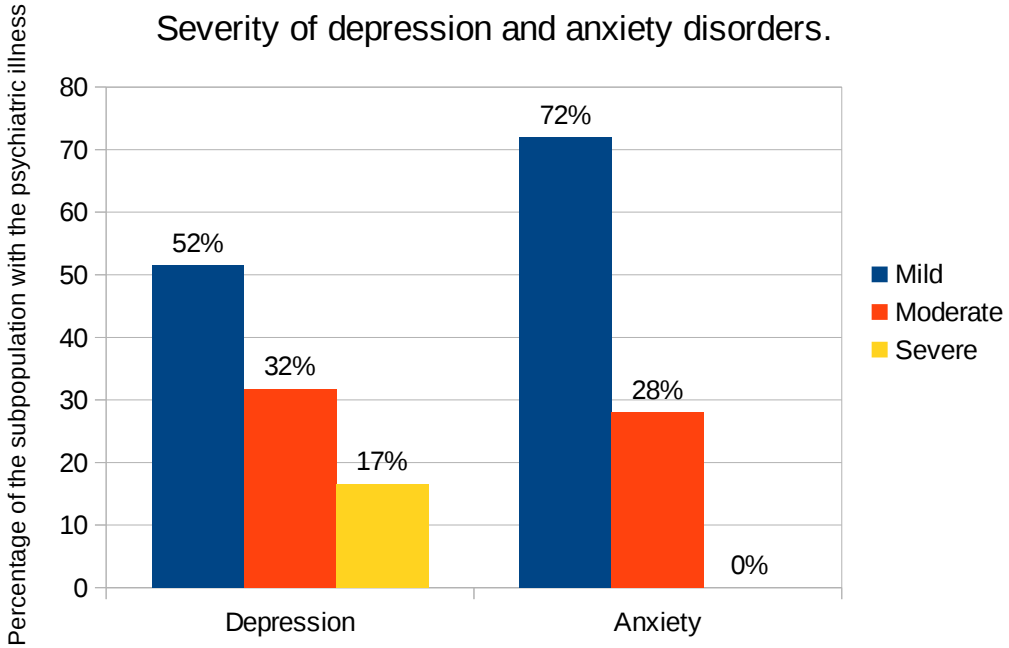
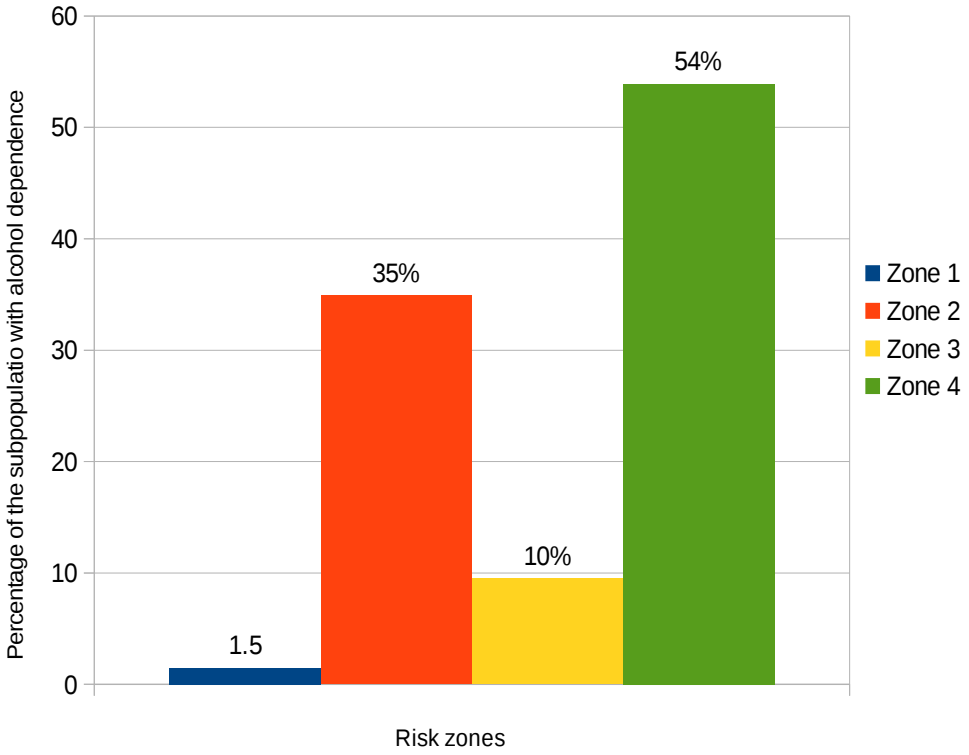
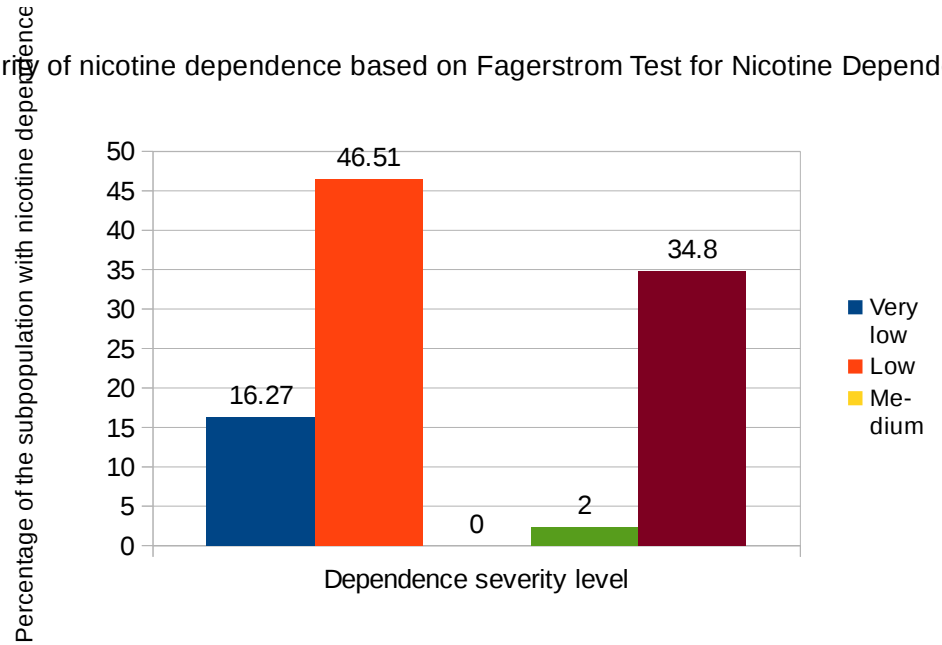


Figure showing severity of alcohol dependence in the study popylation



Severity of nicotine dependence based on Fagerstrom Test for Nicotine Dependence



ASSOCIATION BETWEEN SOCIO-DEMOGRAPHIC FACTORS AND PSYCHIATRIC ILLNESS IN TUBERCULOSIS

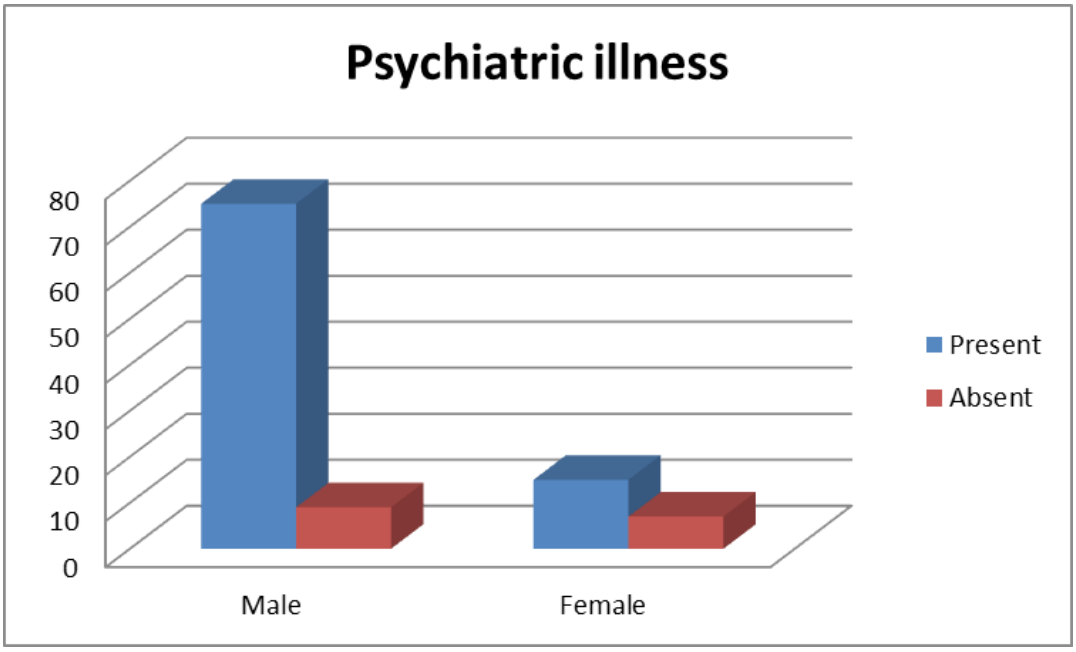
Various socio-demographic data collected during the study were analysed for their relationship with psychiatric illnesses in tuberculosis. Data was analysed in two ways – one subsuming substance use disorders under psychiatric illness, and the other excluding substance use disorders, to see if there occurred a difference. Chi squared and Fisher's exact probability were used for this analysis.

In the analyses subsuming substance use disorders under psychiatric illness, it was observed that male sex had a statistically significant association with presence of psychiatric illness. Fisher exact probability test was used and the value was 6.059, p=0.021. All other socio-demographic factors – age group, religion, education, occupation, family income, socio-economic status, marital status and type of family – did not reach statistical significance.

Table 2: Association between sex and presence of psychiatric illness (including substance use disorders) in the study population

Gender	**Psychiatric illness including substance use disorders**		**Fischer exact probability**	**P value**
	Present	**Absent**		
Male	75	9	6.059	**0.021**
Female	15	7		

Gender variations in presence of psychiatric illnesses including substance use disorders.

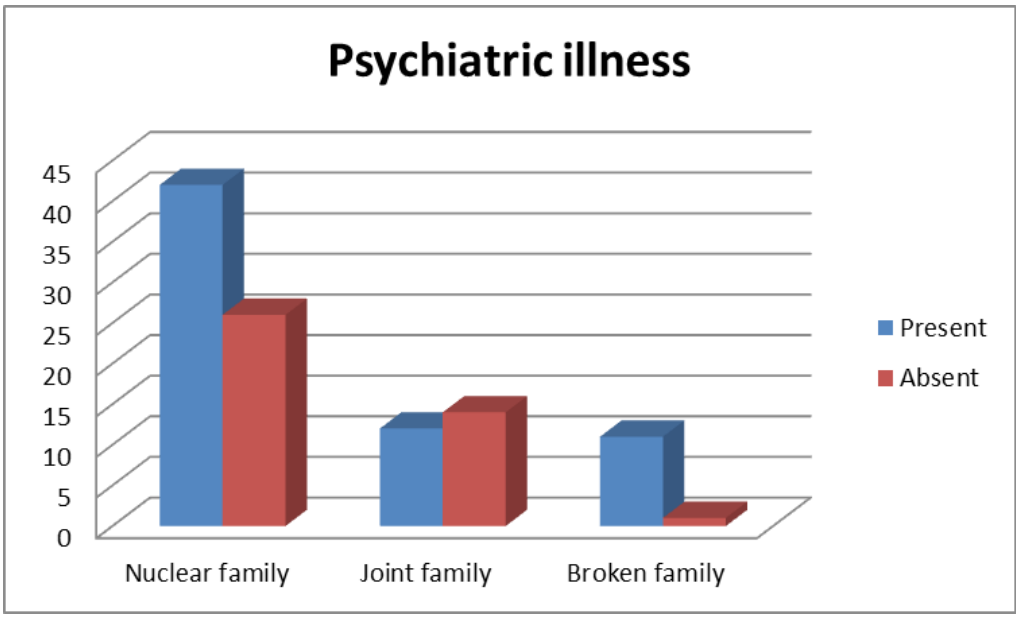


Another set of analysis to observe the relationship between different socio-demographic factors and presence of psychiatric illnesses, this time excluding substance use disorders was done. Type of family (joint family) was found to have a statistically significant association with presence of psychiatric illnesses (Chi squared = 7.186, p = 0.028). All other socio-demographic variables - age group, sex, religion, education, occupation, family income, socio-economic status and marital status did not have statistically significant association with presence of psychiatric illnesses.

Table 3: Association between type of family and presence of psychiatric illness (excluding substance use disorders) in the study population

Type of family	**Psychiatric illness excluding substance use disorder**		**Chi square**	**P value**
	Present	**Absent**		
Nuclear	42	26		
Joint	12	14	7.186	**0.028**
Extended	0	0		
Broken	11	1		

Family type and presence of psychiatric illnesses excluding substance use disorders:



Sex which had statistically significant association with presence of psychiatric illness when substance use disorders were included, was not found to have statistically significance when substance use disorders were excluded (chi squared=0.063, p=0.802).

Table 4: Association between sex and presence of psychiatric illnesses excluding substance use disorders did not reach statistical significance

Gender	Psychiatric illnesses excluding substance use disorders		Chi square	P value
	Present	Absent		
Male	51	33	0.063	0.802
Female	14	8		

Type of family which had statistically significant association with presence of psychiatric illness when substance use disorders were excluded, did not have statistically significant association when substance use disorders were included (chi squared=5.155, p=0.076).

Table 5: Association between type of family and presence of psychiatric illness including substance use disorders:

Type of family	Psychiatric illness including substance use disorders		Chi square	P value
	Present	Absent		
Nuclear	59	9		
Joint	19	7	5.155	0.076
Extended	0	0		
Broken	12	0		

SOCIO-DEMOGRAPHIC FACTORS AND PRESENCE OF PSYCHIATRIC ILLNESSES

S. No.	Socio-demographic variable		Psychiatric illnesses including substance use disorder			P value	Psychiatric illnesses excluding substance use disorders			P value
			Present	Absent			Present	Absent		
1	Age (years)	18-44	41	6	Chi square = 2.622	0.270	28	19	Chi square = 1.297	0.523
		45-64	46	8			35	19		
		65 or more	3	2			2	3		
2	Sex	Male	75	9	Fisher's exact = 6.059	**0.021**	51	33	Fisher's exact = 0.063	0.802
		Female	15	7			14	8		
3	Religion	Hindu	71	16	Chi square = 4.115	0.128	49	38	Chi square = 5.177	0.075
		Muslim	8	0			7	1		
		Christian	11	0			9	2		
		Others	0	0			0	0		
4	Education	Illiterate	30	5	Chi square = 2.855	0.582	22	13	Chi square = 1.209	0.877
		Primary school	22	2			14	10		
		Middle school	30	6			21	15		
		High school	7	3			7	3		
		Intermediate/Post high school diploma	1	0			1	0		
		Graduate/Post graduate	0	0			0	0		
		Professional/Honours	0	0			0	0		
5	Occupation	Unemployed	36	9	Chi square = 2.018	0.569	30	15	Chi square = 1.088	0.780
		Unskilled worker	14	1			8	7		
		Semi-skilled worker	24	3			16	11		
		Skilled worker	16	3			11	8		
		Clerical, shop owner, farmer	0	0			0	0		
		Semi profession	0	0			0	0		
		Profession	0	0			0	0		
6	Family income per month	</=1600	1	0	Chi square = 1.114	0.892	1	0	Chi square = 5.846	0.211
		1601-4809	18	2			14	6		
		4810-8009	45	10			28	27		
		8010-12019	18	3			16	5		
		12020-16019	8	1			6	3		
		16020-32049	0	0			0	0		
		>/=32050	0	0			0	0		

S. No.	Socio-demographic variable		Psychiatric illnesses including substance use disorder			P value	Psychiatric illnesses excluding substance use disorders			P value
7	Socio-economic status	Upper	0	0	Chi square = 1.253	0.535	0	0	Chi square = 0.163	0.922
		Upper middle	0	0			0	0		
		Lower middle	7	2			6	3		
		Upper lower	81	13			57	37		
		Lower	2	1			2	1		
8	Marital status	Single	13	1	Chi square = 3.496	0.479	6	8	Chi square = 6.402	0.171
		Married	59	13			43	29		
		Widowed	7	2			6	3		
		Separated	8	0			7	1		
		Divorced	3	0			3	0		
9	Type of family	Nuclear	59	9	Chi square = 5.155	0.076	42	26	Chi square = 7.186	**0.028**
		Joint	19	7			12	14		
		Extended	0	0			0	0		
		Broken	12	0			11	1		

TUBERCULOSIS DISEASE RELATED FACTORS AND PRESENCE OF PSYCHIATRIC ILLNESS

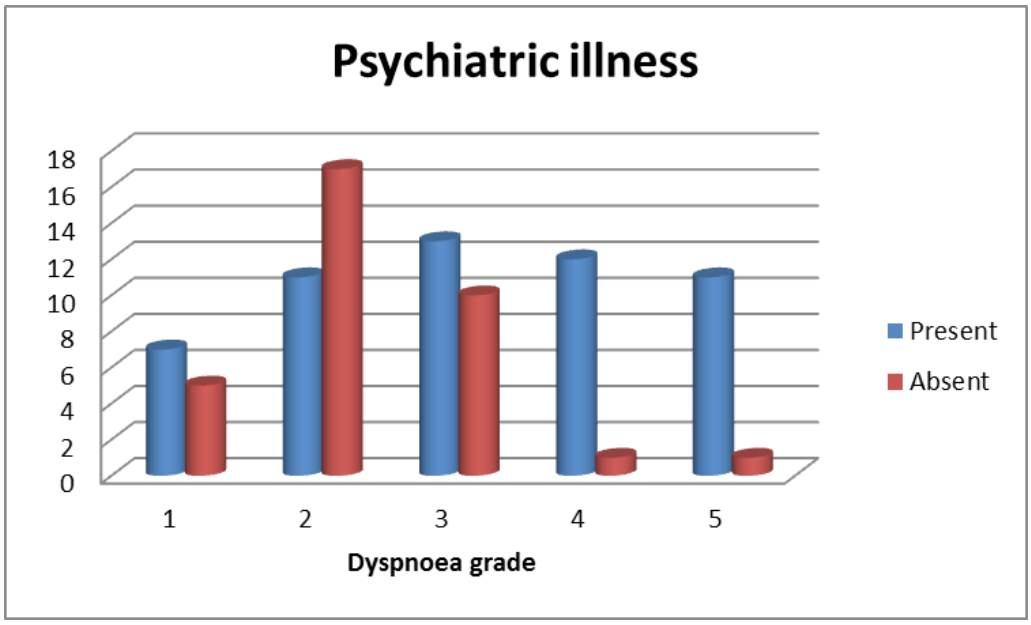
Tuberculosis disease related factors – sputum positivity, extrapulmonary tuberculosis, duration of illness, dyspnea grade, presence of HIV coinfection, duration of illness and drug regimen – were analysed for association with presence of psychiatric illnesses. Again, the analysis was done in two ways – one including substance use disorders, and the other excluding substance use disorders.

Of these, only dyspnoea grade was statistically significantly associated with presence of psychiatric illnesses excluding substance use disorders (chi squared = 15.929, p = 0.003). Association between dyspnoea grade and presence of psychiatric illnesses including substance use disorders was not statistically significant (dyspnoea grade 3 or more, chi squared = 4.583, p = 0.333). All other factors - sputum positivity, extrapulmonary tuberculosis, duration of illness, presence of HIV co-infection, duration of illness and drug regimen – were not statistically associated with presence of psychiatric illnesses.

Table 6: Association between dyspnoea grade and presence of psychiatric illness excluding substance use disorders – statistically significant

Dyspnoea grade	Psychiatric illness excluding substance use disorders		Chi square	P value
	Present	Absent		
1	7	5		
2	11	17		
3 or more	36	10	15.929	**0.003**

Relationship between dyspnoea grade and presence of psychiatric illnesses excluding substance use disorders.



TUBERCULOSIS DISEASE RELATED FACTORS AND PRESENCE OF PSYCHIATRIC ILLNESS

S. No.	Tuberculosis disease related factors		Presence of psychiatric illnesses including substance use disorders			P value	Presence of psychiatric illnesses excluding substance use disorders			P value
			Present	Absent			Present	Absent		
1	Sputum positivity	Positive	74	12	Fischer exact probability =0.463	0.353	55	31	Fischer exact probability =1.332	0.248
		Negative	16	4			10	10		
2	Extra-pulmonary tuberculosis	Present	3	0	Fischer exact probability =0.549	0.609	3	0	Fischer exact probability =1.947	0.226
		Absent	87	16			62	41		
3	Duration of illness	<1 year	15	2	Fischer exact probability =0.18	0.505	10	7	Chi square = 0.05	0.817
		>/= 1 year	75	14			55	34		
4	Dyspnoea grade	1	10	2	Chi square = 4.583	0.333	7	5	Chi square = 15.929	0.003
		2	22	6			11	17		
		3	21	2			13	10		
		4	13	0			12	1		
		5	11	1			11	1		
5	History of default	Present	39	4	Chi square = 1.894	0.169	25	18	Chi square = 0.309	0.578
		Absent	51	12			40	23		
6	History of relapse	Present	13	3	Fischer exact probability =0.197	0.449	9	7	Chi square = 0.204	0.651
		Absent	77	13			56	34		
7	Presence of HIV co-infection	Present	4	1	Fischer exact probability =0.092	0.57	4	1	Fischer exact probability =0.800	0.349
		Absent	85	15			60	40		
8	ATT regimen	Category I	43	10	Chi square =1.178	0.278	33	20	Chi square =0.040	0.842
		Category II	47	6			32	21		

RELATIONSHIP BETWEEN HISTORY OF DEFAULT AND PRESENCE OF PSYCHIATRIC ILLNESS

Analysis was done to observe the association between the negative behavioural factors – default, that is non-adherence - and current presence of psychiatric illness. This analysis was also done in two ways – one, including substance use disorders and the other, excluding substance use disorders. We did not find statistical significance in the analyses.

Table 7: Association between presence of default and current presence of psychiatric illness including substance use disorders – not significant

H/O Default	Psychiatric illness including substance use disorders		Chi square	P value
	Present	Absent		
Present	39	4	1.894	0.169
Absent	51	12		

Table 8: Association between presence of default and current presence of psychiatric illness excluding substance use disorders – not significant

H/O Default	Psychiatric illness excluding substance use disorders		Chi square	P value
	Present	Absent		
Present	25	18	0.309	0.578
Absent	40	23		

RELATIONSHIP BETWEEN HISTORY OF RELAPSE OF TUBERCULOSIS AND PRESENCE OF PSYCHIATRIC ILLNESS

As with another analyses, relationship between history of relapse of tuberculosis and current presence of psychiatric illness was analysed in two ways – one, including and the other, excluding substance use disorders. We did not observe statistical significance in the analyses.

Table 9: Association between presence of history of relapse and current presence of psychiatric illness including substance use disorders – not significant

H/O Relapse	Psychiatric illness including substance use disorders		Fischer exact probability	P value
	Present	Absent		
Present	13	3	0.197	0.449
Absent	77	13		

Table 10: Association between presence of history of relapse and current presence of psychiatric illness excluding substance use disorders – not significant

H/O Relapse	Psychiatric illness excluding substance use disorders		Chi square	P value
	Present	Absent		
Present	9	7	0.204	0.651
Absent	56	34		

RELATIONSHIP BETWEEN HIV CO-INFECTION AND PRESENCE OF PSYCHIATRIC ILLNESS

Presence of HIV co-infection was analysed to find if any statistically significant association exists with presence of psychiatric illness, again including and excluding substance use disorders. No statistical significance was observed.

Table 11: Association between presence of HIV co-infection and presence of psychiatric illness including substance use disorders – not significant

H/O HIV co-infection	Psychiatric illness including substance use disorders		Fischer exact probability	P value
	Present	Absent		
Present	4	1	0.092	0.57
Absent	85	15		

Table 12: Association between presence of HIV co-infection and presence of psychiatric illness excluding substance use disorders – not significant

H/O HIV co-infection	Psychiatric illness excluding substance use disorders		Fischer exact probability	P value
	Present	Absent		
Present	4	1	0.800	0.349
Absent	60	40		

RELATIONSHIP BETWEEN TYPE OF ANTI-TUBERCULAR REGIMEN AND PRESENCE OF PSYCHIATRIC ILLNESS

Most commonly used anti-tubercular regimens are two – category I and category II. Analyses were done to find if any statistically significant relationship exists between the type of anti-tubercular regimen and presence of psychiatric illness. No statistical significance was observed.

Table 13: Association between type of ATT regimen and presence of psychiatric illness including substance use disorders – not significant

ATT regimen	Psychiatric illness including substance use disorders		Chi square	P value
	Present	Absent		
Category 1	43	10	1.178	0.278
Category 2	47	6		

Table 14: Association between type of ATT regimen and presence of psychiatric illness excluding substance use disorders – not significant

ATT regimen	Psychiatric illness excluding substance use disorders		Chi square	P value
	Present	Absent		
Category 1	33	20	0.040	0.842
Category 2	32	21		

RELATIONSHIP BETWEEN PRESENCE OF OTHER MEDICAL CO-MORBIDITIES AND PSYCHIATRIC ILLNESS

We analysed the association between the presence of other medical co-morbidities and the presence of psychiatric illness in the study population. We did not find any statistical significance in the analyses.

Table 15: Association between presence of other medical co-morbidities and presence of psychiatric illnesses including substance use disorders- not significant.

Presence of other medical co-morbidities	Psychiatric illnesses including substance use disorders		Chi square	P value
	Present	Absent		
Present	35	6	0.01	0.916
Absent	55	10		

Table 16: Association between presence of other medical co-morbidities and presence of psychiatric illnesses excluding substance use disorders- not significant.

Presence of other medical co-morbidities	Psychiatric illness excluding substance use disorders		Chi square	P value
	Present	Absent		
Present	26	15	0.12	0.725
Absent	39	26		

ASSOCIATION BETWEEN THE PRESENCE OF ALCOHOL DEPENDENCE AND THE PRESENCE OF PSYCHIATRIC ILLNESSES EXCLUDING SUBSTANCE USE DISORDERS

Analysis to ascertain the relationship between the current presence of alcohol dependence and the presence of psychiatric illnesses excluding substance use disorders did not show statistical significance (Chi-square = 0.07, p=0.797).

Table 17: Association between current presence of alcohol dependence and presence of psychiatric illnesses excluding substance use disorders – not significant.

Current presence of alcohol dependence	**Psychiatric illnesses excluding substance use disorders**		**Chi square**	**P value**
	Present	**Absent**		
Present	38	25	0.07	0.797
Absent	27	16		

ASSOCIATION BETWEEN SMOKING AND PRESENCE OF PSYCHIATRIC ILLNESS

Analysis regarding the association between current nicotine dependence syndrome and presence of psychiatric illnesses was also done. We did not find statistical significance in the results.

Table 18: Association between current presence of nicotine dependence syndrome and presence of psychiatric illnesses excluding substance use disorders - not significant.

Presence of current nicotine dependence	**Psychiatric illnesses excluding substance use disorders**		**Chi square**	**P value**
	Present	**Absent**		
Present	26	17	0.02	0.881
Absent	39	24		

ASSOCIATION BETWEEN SEVERITY OF SMOKING AND PRESENCE OF PSYCHIATRIC ILLNESS

Analyses were done to observe the relationship between Fagerstrom Test for Nicotine Dependence score and presence of psychiatric illnesses excluding substance use disorders. Scores were categorised into 5 levels of severity of dependence: 0-2: very low dependence, 3-4: low dependence, 5: moderate dependence, 6-7: high dependence, 8-10: very high dependence. No statistical significance was observed.

Table 19: Fagerstrom Nicotine Test score grade and presence of psychiatric illnesses excluding substance use disorders

Fagerstrom Nicotine Dependence Test – grade of severity of dependence	**Psychiatric illnesses excluding substance use disorders**		**Chi square**	**P value**
	Present	**Absent**		
Very low	8	7		
Low	13	7	1.18	0.758
Moderate	0	0		
High	4	3		
Very high	1	0		

PAST HISTORY OF PSYCHIATRIC ILLNESS AND CURRENT PRESENCE OF PSYCHIATRIC ILLNESS IN THE STUDY POPULATION

Data regarding presence of past history of psychiatric illnesses in the study population was analysed for association with current presence of psychiatric illness. Analyses were done in two ways – one including substance use disorders in the current psychiatric illness and the other excluding substance use disorders in the current psychiatric illness.

Of the 106 participants, 12 had a history of past psychiatric illness. Of these, 4 had a history of alcohol dependence, 5 had a history of nicotine dependence, 3 had a history of both alcohol and nicotine dependence. 2 persons had a history of depressive episode in the past.

Analyses were also done considering past history of alcohol dependence and nicotine dependence separately. No statistical significance was observed in this type of analysis either. Past history of alcohol dependence was not significantly associated with current presence of psychiatric illness, either including or excluding substance use disorders (Fisher's exact probability=0.004, p=0.715 for analysis which included current substance use disorders, Fisher's exact probability=0.323, p=0.445 for analysis which excluded current substance use disorders).

No statistically significant relationship was observed in either analysis for association between past history of psychiatric illness and current presence

of psychiatric illness. In the analysis including substance use disorders, Fisher's exact probability value was 0.392 (p=0.460). In the analysis excluding substance use disorders, Fisher's exact probability value was 0.985 (p=0.254).

Table 20: Association between presence of past history of psychiatric illness and current presence of psychiatric illness including substance use disorders – not significant

Past H/O psychiatric illnesses	**Current psychiatric illness including substance use disorders**		**Fischer exact probability**	**P value**
	Present	**Absent**		
Present	11	1	0.392	0.460
Absent	79	14		

Table 21: Association between presence of past history of psychiatric illness and current presence of psychiatric illness excluding substance use disorders – not significant

Past H/O psychiatric illnesses	**Current psychiatric illness excluding substance use disorders**		**Fischer exact probability**	**P value**
	Present	**Absent**		
Present	9	3	0.985	0.254
Absent	56	37		

Table 22: Association between past history of alcohol dependence and current presence of any psychiatric illness – not significant

Past H/O Alcohol dependence	Current psychiatric illness		Fischer exact probability	P value
	Present	Absent		
Present	6	1	0.004	0.715
Absent	84	15		

Table 23: Association between past history of alcohol dependence and current presence of psychiatric illness excluding substance use disorders – not significant

Past H/O Alcohol dependence	Current psychiatric illness		Fischer exact probability	P value
	Present	Absent		
Present	5	2	0.323	0.445
Absent	60	39		

Table 24: Association between past history of nicotine dependence and current presence of any psychiatric illness – not significant

Past H/O Nicotine dependence	Current Psychiatric illness		Fischer exact probability	P value
	Present	Absent		
Present	8	0	1.538	0.257
Absent	82	16		

Table 25: Association between past history of nicotine dependence and current presence of psychiatric illness excluding substance use disorders – not significant

Past H/O Nicotine dependence	Current Psychiatric illness		Fischer exact probability	P value
	Present	Absent		
1	7	1	2.500	0.111
2	58	40		

RELATIONSHIP BETWEEN PRESENT OR PAST SUBSTANCE USE DISORDERS AND CURRENT PRESENCE OF PSYCHIATRIC ILLNESSES

We analysed the data by combining the current and past alcohol dependence to observe the association with current presence of psychiatric illnesses excluding substance use disorders. We also did the same with nicotine dependence. We did not find statistical significance in the analyses.

Table 26: Association between presence or past alcohol dependence and current presence of psychiatric illnesses exlcuding substance use disorders - not significant.

Presence of current or past alcohol dependence	**Psychiatric illnesses excluding substance use disorders**		**Chi square**	**P value**
	Present	**Absent**		
Present	30	18	0.05	0.821
Absent	35	23		

Table 27: Association between presence or past nicotine dependence and current presence of psychiatric illnesses exlcuding substance use disorders - not significant.

Presence of current or past nicotine dependence	**Psychiatric illness excluding substance use disorders**		**Chi square**	**P value**
	Present	**Absent**		
Present	33	18	0.47	0.491
Absent	32	23		

RELATIONSHIP BETWEEN PRESENCE OF ANXIETY DISORDERS AND PRESENCE OF DEPRESSIVE DISORDERS

Analyses were done to observe the relationship between presence of depressive disorder and presence of anxiety disorders. Both depressive and anxiety disorders were present in 23 people, only depressive disorder was present in 41 people, only anxiety disorder was present in 1 person, and both were absent in 41 people. About 56% of people with depressive disorder also had anxiety disorder, and about 95.8% of people with anxiety disorder also had depressive disorder. The relationship between presence anxiety and depressive disorders was found to be statistically significant (Chi square = 19.30, p = 0.0001). We also analysed data regarding significance between severity of depression and severity of anxiety. We did not find any statistical significance (Chi square = 2.42, p = 0.298).

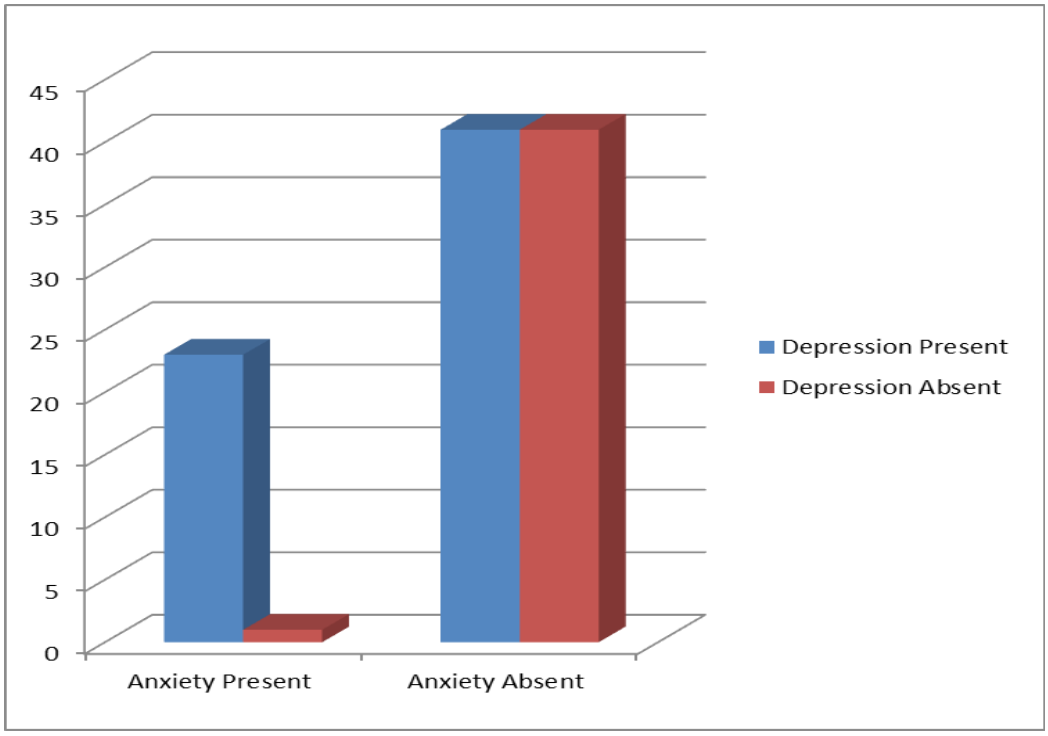
Table 28: Relationship between presence of depressive disorder and presence of anxiety disorder - statistically significant.

Anxiety	**Depression**		**Chi square**	**P value**
	Present	**Absent**		
Present	23	1	16.30	**0.0001**
Absent	41	41		

Table 29: Relationship between severity of depression and severity of anxiety disorders - not significant

HAM D score grades	HAM A score grades			Chi square	P value
	Mild	Moderate	Severe		
Mild	6	1	0		
Moderate	6	2	0	2.42	0.298
Severe	4	4	0		

Relationship between presence of depression and presence of anxiety.



RELATIONSHIP BETWEEN DEPRESSION SEVERITY AND VARIOUS TUBERCULOSIS DISEASE RELATED FACTORS AND SUBSTANCE DEPENDENCE

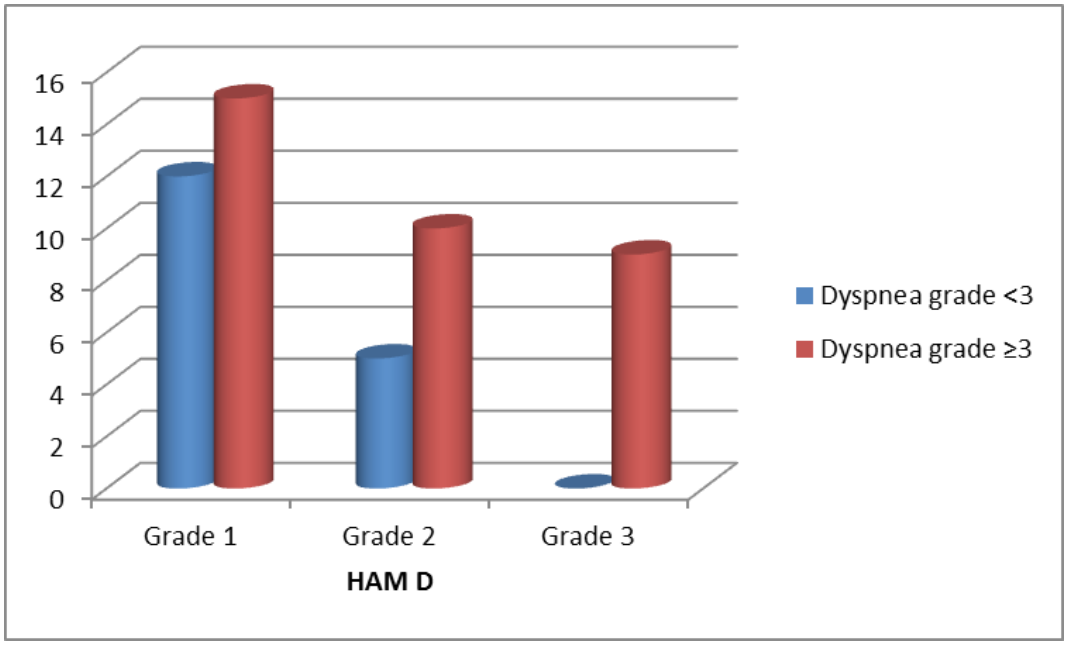
Depression severity was analysed against various tuberculosis disease related factors – sputum positivity, presence of extra-pulmonary tuberculosis, dyspnoea grade, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, presence of co-morbid medical conditions, Fagerstrom test for nicotine dependence score and AUDIT score risk zone. We were able to observe statistical significance with only dyspnoea grade – moderate and severe depression were significantly associated with dyspnoea grade 3 or more (Chi square = 6.00, p = 0.049). All other comparisons - sputum positivity, presence of extra-pulmonary tuberculosis, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, presence of co-morbid medical conditions, Fagerstrom test for nicotine dependence score and AUDIT score risk zone – were not statistically significant.

Table 30: Association between severity of depression and severity of dyspnoea - statistically significant (moderate and severe depression were significantly associated with dyspnoea grade 3 or more).

HAM D	Dyspnoea grade		Chi square	P value
	Less than 3	3 or more		
Mild	12	15		
Moderate or severe	5	19	6.00	**0.049**

*not all patients had dyspnoea

Relationship between dypsnoea grade and severity of depression.



RELATIONSHIP BETWEEN ANXIETY SEVERITY AND VARIOUS TUBERCULOSIS DISEASE RELATED FACTORS AND SUBSTANCE DEPENDENCE

Analyses were done to observe the relationship between anxiety severity and various tuberculosis disease related factors and substance use disorder - sputum positivity, presence of extra-pulmonary tuberculosis, dyspnoea grade, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, presence of co-morbid medical conditions, Fagerstrom test for nicotine dependence score and AUDIT score risk zone. Statistically significant positive relationship was observed between mild anxiety and extra-pulmonary tuberculosis (Fisher exact probability = 15.30, p=0.0003). For relationship between anxiety severity and sputum positivity, mild anxiety, as compared to moderate anxiety, was more associated with sputum positivity (Fisher exact probability = 9.80, p=0.004).

Table 31: Association between anxiety severity and presence of extra-pulmonary tuberculosis - statistically significant (presence of extra-pulmonary tuberculosis was more associated with mild anxiety, as compared to moderate anxiety).

HAM A	Extra-pulmonary TB		Fisher exact probability	P value
	Present	Absent		
Mild	1	16	15.30	**0.0003**
Moderate	6	1		
Severe	0	0		

Table 32: Association between anxiety severity and presence of sputum positivity - statistically significant in a reverse way (sputum positivity was more associated with mild anxiety, as compared to moderate anxiety).

HAM A	Sputum positivity		Fisher exact probability	P value
	Present	Absent		
Mild	14	3	**9.80**	**0.004**
Moderate	1	6		
Severe	0	0		

DISCUSSION

The total participants in our study were 106. Of these 84 (79.24%) were males, and 22 (20.76%) were females. Gender ratio varies in the previous studies, some have more male patients than females, while others have more female than male patients. About 44.3% were between 18-44 years, 50.94% were between 45-64 years, and 4.71% were above 65 years of age. About 82.07% belonged to Hindu religion, 7.54% to Islam, and 10.37% to Christianity. This is consistent with the proportions observed in the general population. About 22.6% had had primary school level education, 33.96% had middle school level education, 9.4% had high school level education, 0.94% had intermediate level education, and 33.01% had had no formal education. About 42.45% were unemployed, 14.15% were unskilled workers, 25.47% were semi-skilled workers, and 17.92% were skilled workers. This is consistent with the findings by various past studies - Masumoto, S., (2014) – 52.6%, Olusoji Mayowa Ige, (2011) – 86.2%, Lasebikan, V. O., (2015) – 65.2%. Twenty (90.90%) of the twenty-two females were unemployed, while 25 (29.76%) of the 84 males were unemployed in our study. Most of the study population (88.67%) were from upper lower socio-economic status. About 8.4% from lower middle socio-economic status, and 2.8% from lower socio-economic status. The hospital where our study was done is a urban tertiary care institution that is government run. About 67.9% were living with spouse, 7.5% were separated, 2.8% were divorced, 8.4% were widowed, and 13.2% were

single. This agrees with the observations of others in the past studies – Masumoto, S., 2014, Olusoji Mayowa Ige, 2011, Xavier, 2015, Lasebikan, V. O., 2015, Aghanwa HS, 1998. Majority were from nuclear families (64.1%), about 24.5% from joint families, and 11.3% from broken families. This only reflects the trend in the general population – majority are from nuclear families.

About 81.1% of the patients had a sputum positive pulmonary tuberculosis. About 2.8% had extra-pulmonary tuberculosis. Duration of illness varied widely – from 1 month to 48 months. Mean duration of tuberculosis was about 5.7 months. About 83.9% had a duration of less than 12 months, while 16.03% had a duration of 12 months or more. Mean duration in our study is much less than observations by previous studies – 10.6 years (Mathai, 1981), 8.78 years (Moussas, G., 2008). Tuberculosis services have improved much in the recent years with better reporting (WHO, Global tuberculosis report 2015), which may be one of the reasons for this observation. Clinically significant dyspnoea was present in about 83.01% of the study population. A history of default from ATT regimen was present in about 40.5% of the study population. A history of relapse of tuberculosis after successful course of ATT was present in about 15.09%. No one in the study population had a history of failure of anti-tubercular treatment. Recall bias may partially explani this observation. HIV co-infection was present in 5 patients (4.7%). Exactly 50% people were on Category I ATT, and the other 50% were on Category II ATT.

About 38.67% (n=40) had other medical co-morbidities, of which Type

2 Diabetes Mellitus was the commonest, being present in 28 people (26.41%). This is comparable to the finding by Shen, T. C. (2014), who observed that the prevalence of Diabetes in tuberculosis patients was 17.1%.

About 61.32% (n=65) of the study population had at least one psychiatric illness. When substance use disorders were included, about 84.90% (n=90) had a psychiatric illness. This is comparable to the findings of previous studies from India - Panchal SL, 2011 – 82%, Chandra P, 2011 – 76%, Natani, 1985 – 70%, and Prakash (2011) – 76%. Depressive disorder was the most common psychiatric morbidity, present in about 62.26% (n=66) of the patients. Among these, 51.5% had mild, 31.8% had moderate, and 16.6% had severe depressive disorders. Others in the past similar prevalence rates in the Indian population – Purohit, 1978 – 54.17%, and Meghnani ML, 1988 – 53.6%.

Alcohol dependence syndrome was the next common morbidity, which was present in about 59.43% (n=63) of the patients. Majority (53.9%) of the patients fell in the risk zone 4 based on AUDIT scores. The prevalence of alcohol dependence syndrome as observed in our study is much higher than the prevalence reported in the general population in India, which is 2.6% (WHO, Global status report on alcohol and health, 2014).

Nicotine dependence syndrome was the third most common morbidity – about 40.59% (n=43) had nicotine dependence syndrome. All were males and were using nicotine in the form of smoking cigarettes or beedis. This is much higher than the prevalence in the general population which is 24.3% in males in

India (WHO report on the global tobacco epidemic, 2015).

About 34.90% of the total study population had both alcohol and nicotine dependence syndromes. About 58.7% of those with alcohol dependence syndrome also had nicotine dependence syndrome. About 86% of those with nicotine dependence syndrome also had alcohol dependence syndrome. This is consistent with the findings of Przybylski G, (2014), who observed that 93.4% of smokers were also chronic users of alcohol. No other substance use disorders were reported in our study.

Anxiety disorders were the fourth most common morbidity – present in about 23.5% (n=25) patients. About 72% of these patients had mild anxiety, and 28% had moderate anxiety on Hamilton Anxiety Rating Scale scores. The prevalence of anxiety disorders in our study conforms with the finding by van den Heuvel, 2013, who observed a prevalence of 30.8% for any anxiety disorder.

About 22.64% of the total study population had both depressive and anxiety disorders.

About 6.6% (n=7) of the patients had a past history of alcohol dependence, while about 7.5% (n=8) had a past history nicotine dependence, and were currently abstinent for at least 12 months. No other psychiatric illnesses in the past were reported in the participants. The reasons for stopping alcohol or nicotine use in this population as reported by patients were one or more of these – worry regarding deteriorating health, poor income due to loss

of job, or restricted ambulation due to breathlessness.

About 45.2% (n=48) had a family history of psychiatric illness – alcohol dependence, nicotine dependence or both. No other psychiatric illness was reported.

Among various socio-demographic factors, male gender was significantly associated with presence of psychiatric illnesses including substance use disorders (Fisher exact probability = 6.059, p=0.021). This is in variance with most studies in the past, which have found either that female gender was more associated with psychiatric illness in tuberculosis, or that there was no significant difference. But, when substance use disorders were excluded, the significance in our study was lost (chi squared=0.063, p=0.802). This is consistent with past studies that show no statistically significant difference with respect to gender (Mathai 1981, Aghanwa HS 1998). The observation in our study, that when substance use disorders were included, male gender was significantly more associated with presence of psychiatric illnesses, and that when substance use disorders were excluded, the significance was lost, can be explained by the fact that substance use disorders were not observed in the female participants in our study. Substance use disorders were observed only in males in our study.

Joint family - as opposed to nuclear, extended, and broken families – was significantly associated with presence of psychiatric illnesses excluding substance use disorders (Chi squared = 7.186, p = 0.028). This is in variance

with the findings of Olusoji Mayowa Ige (2011), who observed that nuclear family was more associated with psychiatric illness. All other variables – age group, religion, education, occupation, family income, socio-economic status, marital status – did not reach statistical significance. Past studies show only equivocal results for almost all socio-demographic variables.

Among the tuberculosis disease related factors, dyspnoea grade of 3 or more was significantly associated with presence of psychiatric illnesses, when substance use disorders were excluded (chi squared = 15.929, p = 0.003). This is in keeping with the findings of Masumoto, S (2014). All the other factors - sputum positivity, extra-pulmonary tuberculosis, duration of illness, presence of HIV co-infection, duration of illness and drug regimen – were not statistically associated with presence of psychiatric illnesses. Longer duration of illness has been found to be associated with presence of psychiatric illnesses in past studies (Olusoji Mayowa Ige 2011, Moussas, G. 2008). Our finding is in variance these studies.

History of default and history of relapse were not significantly associated with presence of psychiatric illnesses in our study. This could be because of recall bias on the part of the participants.

We also did not find significant association between HIV co-infection and presence of psychiatric illness. This is consistent with the findings of Deribew A (2010) and van den Heuvel (2013).

We did not find significance in the association between type of anti-

tubercular regimen and presence of psychiatric illness. This is in variance with Olusoji Mayowa Ige (2011), who found an association between Category 2 tuberculosis and severity of depression.

We did not find statistical significance in the analysis of association between presence of other medical co-morbidities in general and presence of psychiatric illnesses. This is variance with the findings by Shen, T. C., (2014), who found that medical co morbidities in general increase the risk of psychiatric illness. But, in their study, hypertension was more common than diabetes in the tuberculosis group, and they had not found a statistical significance when diabetes alone was compared with the presence of depression (aOR = 0.98, 95% CI = 0.85 – 1.12). In our study, diabetes was the most common medical comorbidity, accounting for about 70% of the total medial co-morbidities. Moreover, their study had included HIV and schizophrenia as co-morbidities, while we had considered HIV separately and also had no patient with schizophrenia in the study population.

We did not find statistically significant association between current presence of alcohol dependence syndrome and presence of psychiatric illnesses excluding substance use disorders. We also did not find significance in the association with current presence of nicotine dependence syndrome, past history of alcohol dependence, past history of nicotine dependence, present or past history of alcohol dependence, or, present or past history of nicotine dependence. This may be because both substance use disorders and psychiatric

illnesses had high prevalences in our study population.

We did find a statistically significant relationship between severity of alcohol dependence and presence of psychiatric illnesses excluding substance use disorders. AUDIT score of 8 or more was significantly associated with presence of psychiatric illnesses (chi square = 16.15, p=0.001). This is consistent with the findings of Volkmann T (2015) and in variance with the findings of Alcaide J (1996) and Sopori M (2002).

We found a statistically significant association between presence of depressive disorder and presence of anxiety disorder (Chi square = 19.30, p = 0.0001). But severity of depression did not correlate with severity of anxiety.

We also found a statistically significant association between severity of depression and dyspnoea of grade 3 or more (Chi square = 6.00, p = 0.049). This is in agreement with the finding by Masumoto (2014) - dyspnoea grade 3 or more was significantly associated with the presence of depression in tuberculosis (aOR=2.84, 95% CI=1.32-6.12, p=0.008) (Masumoto, S., 2014). We did not find statistical significance between severity of depression and sputum positivity, presence of extra-pulmonary tuberculosis, past history of relapse, past history of default, past history of failure of treatment, presence of HIV co-infection, presence of co-morbid medical conditions, Fagerstrom test for nicotine dependence score or AUDIT score risk zone.

We found an association between mild anxiety (as opposed to moderate

anxiety) and sputum positivity, and mild anxiety (as opposed to moderate anxiety) and extra-pulmonary tuberculosis. The relationship could probably be spurious, as previous studies do not substantiate this finding which either observed no significant association or a significant association with sputum positivity or extra-pulmonary tuberculosis (Mathai 1981, Masumoto, S. 2014).

Summarising, the prevalence of psychiatric illnesses in the study population was 61.32% when substance use disorders were excluded, and 84.90% when substance use disorders were included. Depressive disorder was the commonest morbidity (62.26%), followed by alcohol dependence syndrome (59.43%), nicotine dependence syndrome (40.59%), and anxiety disorders (23.5%). Statistically significant associations were observed between the following variables in the study population:

1. Male gender and presence of psychiatric illnesses including substance use disorders.
2. Joint family and presence of psychiatric illnesses excluding substance use disorders.
3. Dyspnoea grade of 3 or more and presence of psychiatric illnesses excluding substance use disorders.
4. Severity of alcohol dependence (AUDIT score of 8 or more) and presence of psychiatric illnesses excluding substance use disorders.
5. Presence of depressive disorder and presence of anxiety disorder.
6. Severity of depression and dyspnoea of grade 3 or more.

CONCLUSION

The WHO, in its world health report 2001, had stressed the importance of mental health. It had said that one person in every four will develop psychiatric illness at some stage of life. Also saying that only a small minority of those with psychiatric illnesses are actually on treatment, it emphasized management of psychiatric illnesses at primary care level (WHO, World health report, 2001).

Mental and behaviour disorders accounted for about 7.3% of global Disability Adjusted Life Year (DALY) in 2012. Unipolar depressive disorder is among the top ten leading cause of Disability Adjusted Life Year (DALY) at ninth place, responsible for 2.8% of all DALYs (WHO, DALY Global). Anxiety disorders accounted for about 1% and alcohol use disorders accounted for about 1.2% of all DALYs.

A high prevalence of psychiatric illnesses in patients with tuberculosis (65%) has been observed in our study and also in previous studies. Given the burden of tuberculosis on a developing country like ours, and given the observations in past studies that the presence of psychiatric illnesses in tuberculosis is associated with poor outcomes, it becomes obvious that the psychiatric illnesses in this group of patients need to be effectively identified and managed.

A high prevalence of alcohol dependence syndrome (59%) and nicotine dependence syndrome (40%) has been observed in our study and also in

prevalence studies. Moreover, severity of alcohol dependence was observed to be significantly associated with presence of psychiatric illness in the study population. Effective identification and management of alcohol and nicotine dependence syndrome can improve the outcome of tuberculosis.

An effective liaison services between the physicians treating tuberculosis and psychiatric services can improve the outcome of tuberculosis and thereby improve the quality of life of people with tuberculosis.

LIMITATIONS OF THE STUDY

Our study included people who were mostly from upper lower socio-economic status. People from higher socio-economic status have not been represented adequately in our study. Participant factors like recall bias may have interfered with certain information. Ours is a cross sectional study. A longitudinal follow up study may provide more information regarding relationship between presence of psychiatric illness and outcome of tuberculosis.

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APPENDIX

INSTITUTIONAL ETHICAL COMMITTEE
GOVT.KILPAUK MEDICAL COLLEGE,
CHENNAI-10
Protocol ID. No. 01/2015 Dt: 22.12.2015
CERTIFICATE OF APPROVAL

The Institutional Ethical Committee of Govt. Kilpauk Medical College, Chennai reviewed and discussed the application for approval "Psychiatric morbidity in people with tuberculosis : a cross sectional study".- For Project Work submitted by Dr.D.David Malaiarasan, Post Graduate in MD (Psy) Govt. Kilpauk Medical College, Chennai.

The Proposal is APPROVED.

The Institutional Ethical Committee expects to be informed about the progress of the study any Adverse Drug Reaction Occurring in the Course of the study any change in the protocol and patient information /informed consent and asks to be provided a copy of the final report.

5/1/16

DEAN,
Govt.Kilpauk Medical College,
Chennai – 10.

5/1/16

INFORMED CONSENT FORM

STUDY: "Psychiatric morbidity in people with tuberculosis: a cross sectional study".

STUDY CENTRE: Department of Chest Medicine, Govt. Kilpauk Medical College Hospital.

PATIENT'S NAME :

PATIENT'S AGE :

I.P NO. :

Patient may check ( ) these boxes

I confirm that I understood the purpose of the procedure for the above study. ( )

I had the opportunity to ask question and all my questions and doubts have been answered to my complete satisfaction. ( )

I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving reason, without my legal rights being affected. ( )

I understand that the ethical committee members and the regulatory authorities will not need my permission to look at my health records, both in respect of the current study and any further research that may be conducted in relation to it, even if I withdraw from the study I agree to this access. ( )

However, I understand that my identity will not be revealed in any information released to third parties or published, unless as required under the law. ( )

I agree not to restrict the use of any data or results that arise from the study. ( )

I agree to take part in the above study and to comply with the instructions given during the study and faithfully co-operate with the study team and to immediately inform the study staff if I suffer from any deterioration in my

health or well being or any unexpected or unusual symptoms. ( )

I hereby consent to participate in this study. ( )

I hereby give permission to undergo complete clinical examination and diagnostic tests including hematological, biochemical, radiological tests.

( )

Signature / thumb impression

Patient's name and address:

Place:

Date:

Signature of the investigator:

Study investigator's name:

Place:

Date:

PARTICIPANTS' INFORMATION SHEET

Investigator : Dr D. David Malaiarasan

Name of the participant :

Study title: "Psychiatric morbidity in people with tuberculosis: a cross sectional study".

You are invited to take part in this research study. We have got approval from the IEC. You are asked to participate because you satisfy the eligibility criteria.

What is the purpose of this research?

In this study, we aim to assess the prevalence of psychiatric illnesses in people undergoing treatment for tuberculosis, the association between psychiatric comorbidity and different sociodemographic factors (age, gender, education) and disease related factors (duration of illness, grade of dyspnea in pulmonary TB, MDR-TB, HIV-TB coinfection), to assess the relationship between psychiatric comorbidity and negative behavioural factors like poor adherence and history of defaulting. This will help in assessing the burden of psychiatric illnesses in people with tuberculosis and how it affects the outcome of tuberculosis, so that earlier detection and treatment of psychiatric illnesses may improve the outcome of tuberculosis.

Benefits:

This study will benefit all people who are undergoing treatment for tuberculosis and help improve the success rate of tuberculosis treatment, and also reduce the incidence of drug resistant tuberculosis.

Discomforts and risks:

No interventional procedure is done in this study.

Confidentiality:

Patients who participate in the study and their details will be maintained confidentially and at any cost, those details will not be let out.

Right to withdraw:

Patients will not be forced to complete the study. At any cost, in such circumstances the treatment will not be compromised.

Signature/Thumb impression of the participant:

Signature of the investigator:

Date :

Place :

சுய ஒப்புதல் படிவம்

ஆய்வு செய்யப்படும் தலைப்பு:

"காசநோய் உள்ளவர்களிடம் இருக்கும் மனநோய்களைக் குறித்த ஆராய்ச்சி."

ஆராய்ச்சி நிலையம்: நெஞ்சகத் துறைப் பிரிவு, கீழ்ப்பாக்கம் மருத்துவக்கல்லூரி அரசு மருத்துவமனை, சென்னை.

பங்கு பெறுபவரின் பெயர்:

உறவு முறை:

பங்கு பெறுபவரின் எண்:

பங்கு பெறுபவர் இதனை ( ) குறிக்கவும்

மேலே குறிப்பிட்டுள்ள மருத்துவ ஆய்வின் விவரங்கள் எனக்கு விளக்கப்பட்டது. என்னுடைய சந்தேகங்களைக் கேட்கவும், அதற்கான தகுந்த விளக்கங்களைப் பெறவும் வாய்ப்பளிக்கப்பட்டது. ( )

நான் இவ்வாய்வில் தன்னிச்சையாகத்தான் பங்கேற்கிறேன். எந்தக் காரணத்தினாலோ எந்தக் கட்டத்திலும் எந்த சட்ட சிக்கலுக்கும் உட்படாமல் நான் இவ்வாய்வில் இருந்து விலகிக் கொள்ளலாம் என்றும் அறிந்து கொண்டேன்.

( )

இந்த ஆய்வு சம்மந்தமாகவும், மேலும் இது சார்ந்த ஆய்வு மேற்கொள்ளும்போதும், இந்த ஆய்வில் பங்குபெறும் மருத்துவர் என்னுடைய மருத்துவ அறிக்கைகளைப் பார்ப்பதற்கு என் அனுமதி தேவையில்லை என அறிந்துகொள்கிறேன். நான் ஆய்வில் இருந்து விலகிக் கொண்டாலும் இது பொருந்தும் என அறிகிறேன். ( )

இந்த ஆய்வின் மூலம் கிடைக்கும் தகவல்களையும், பரிசோதனை முடிவுகளையும் மற்றும் சிகிச்சை தொடர்பான தகவல்களையும் மருத்துவர் மேற்கொள்ளும் ஆய்வில் பயன்படுத்திக் கொள்ளவும், அதைப் பிரசுரிக்கவும் என் முழு மனதுடன் சம்மதிக்கிறேன்.

( )

இந்த ஆய்வில் பங்கு கொள்ள ஒப்புக்கொள்கிறேன். எனக்குக் கொடுக்கப்பட்ட அறிவுரைகளின் படி நடந்துகொள்வதுடன், இந்த ஆய்வை மேற்கொள்ளும் மருத்துவ அணிக்கு உண்மையுடன் இருப்பேன் என்றும் உறுதியளிக்கிறேன். என் உடல் நலம் பாதிக்கப்பட்டாலோ அல்லது எதிர்பாராத வழக்கத்திற்கு மாறாக நோய்க்குறி தென்பட்டாலோ உடனே அதை மருத்துவ அணியிடம் தெரிவிப்பேன் என உறுதி

அளிக்கிறேன்.

( )

இந்த ஆய்வில் எனக்கு மருத்துவப் பரிசோதனை செய்து கொள்ள மற்றும் ஆய்வில் பங்கேற்க நான் முழு மனதுடன் சம்மதிக்கிறேன்.

( )

பங்கேற்பவரின் கையொப்பம் / கட்டைவிரல் ரேகை:

_____

இடம்: _____

தேதி: _____

பங்கேற்பவரின் பெயர் மற்றும் விலாசம்::

ஆய்வாளரின் கையொப்பம் _____

இடம் _____

தேதி _____

ஆய்வாளரின் பெயர் _____

ஆராய்ச்சி தகவல் தாள்

கிழ்பாக்கம் அரசு பொது மருத்துவமனையில் காசநோய் உள்ளவர்களிடம் இருக்கும் மனநோய்களைக் குறித்து ஆராய்ச்சி செய்ய உள்ளோம். நீங்கள் இந்த ஆராய்ச்சியில் பங்கேற்க நாங்கள் விரும்புகிறோம். இந்த ஆராய்ச்சியில் பங்கேற்பதால் தங்களது நோயின் ஆய்வறிக்கையோ அல்லது சிகிச்சையோ பாதிக்கப்படாது என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியின் முடிவுகளை அல்லது கருத்துகளை வெளியிடும் போதோ அல்லது ஆராய்ச்சியின் போதோ தங்களது பெயரையோ அல்லது அடையாளங்களையோ வெளியிடமாட்டோம் என்பதையும் தெரிவித்துக் கொள்கிறோம்.

இந்த ஆராய்ச்சியில் பங்கேற்பது தங்களுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் நீங்கள் எந்நேரமும் இந்த ஆராய்ச்சியில் இருந்து பின்வாங்கலாம் என்பதையும் தெரிவித்துக்கொள்கிறோம்.

இந்த சிறப்புப் பரிசோதனைகளின் முடிவுகளை ஆராய்ச்சியின் போதோ அல்லது ஆராய்ச்சியின் முடிவின் போதோ தங்களுக்கு அறிவிப்போம் என்பதையும் தெரிவித்துக்கோள்கிறோம்.

ஆராய்ச்சியாளர் கையொப்பம் பங்கேற்பாளர் கையொப்பம்

தேதி:

PROFORMA

Name:

Address:

Age: (1)<18years (2) 18-44years (3) 45-64years (4) >65years

Sex: (1) male (2) female

Religion: (1) Hindu (2) Muslim (3) Christian (4) others

Education: (1) Illiterate (2) Primary school (3) Middle school (4) High school (5) Intermediate / Post High school diploma (6) Graduate/Postgraduate (7) Professional/Honours

Occupation: (1) Unemployed (2) Unskilled worker (3) Semi-skilled worker (4) Skilled worker (5) Clerical, Shop owner, Farmer (6) Semi profession (7) Profession

Family income per month: (1)Rs <1600 (2)Rs 1601-4809 (3)Rs 4810-8009 (4)Rs 8010-12019 (5)Rs 12020-16019 (6)Rs 16020-32049 (7)Rs >/=32050

Socio-economic status: (1) Upper (2) Upper Middle (3) Lower Middle (4)Upper Lower (5) Lower

Marital status: (1) single (2) married (3) widowed (4) Separated

(5) divorced

Type of family: (1) nuclear (2) joint (3) extended (4) broken

If Pulmonary tuberculosis:

Sputum positivity: (1) Yes (2) No

If Extrapulmonary tuberculosis: (1) Yes (2) No

Duration of tuberculosis illness (in months):

Dyspnea grade: (1) (2) (3) (4) (5)

Presence of MDR TB: (1) Yes (2) No

Presence of Rifampicin Resistant TB (RR-TB): (1) Yes (2) No

Presence of XDR TB: (1) Yes (2) No

History of default: (1) Yes (2) No

History of relapse: (1) Yes (2) No

History of failure of treatment: (1) Yes (2) No

Presence of HIV coinfection: (1) Yes (2) No

ATT drugs the patient is on: (1) CAT I (2) CAT II

Other co-existing medical disorders:

Psychiatric diagnosis according to ICD-10:

HAM-D 17 score:

HAM-A score:

Fagerstorm nicotine dependence test score:

AUDIT score:

Past history of psychiatric illness: (1) Yes (2) No

Diagnosis:

Family history of psychiatric illness: (1) Yes (2) No

Diagnosis:

KUPPUSWAMY'S SOCIOECONOMIC STATUS SCALE:

(A) EDUCATION	SCORE
Profession or Honours	7
Graduate or post graduate	6
Intermediate or post high school diploma	5
High school certificate	4
Middle school certificate	3
Primary school certificate	2
Illiterate	1
(B) OCCUPATION	**SCORE**
Profession	10
Semi-Profession	6
Clerical, Shop-owner, Farmer	5
Skilled worker	4
Semi-skilled worker	3
Unskilled worker	2
Unemployed	1
(C) MONTHLY FAMILY INCOME (Modified for 2012)	**SCORE**
≥32050	12
16020 – 32049	10
12020 – 16019	6
8010 – 12019	4
4810 – 8009	3
1601 – 4809	2
≤ 1600	1

Total Score - Socioeconomic class

26-29 - Upper (I)

16-25 - Upper Middle (II)

11-15 - Middle/Lower middle (III)

5-10 - Lower/Upper lower (IV)

<5 - Lower (V)

HAMILTON DEPRESSION RATING SCALE (HAMD-17)

1. Depressed Mood (sadness, hopeless, helpless, worthless)

0 - Absent

1 - These feeling states indicated only on questioning

2 - These feeling states spontaneously reported verbally

3 - Communicates feeling states non-verbally – i.e., through facial expression, posture, voice,

and tendency to weep

4 - Patient reports VIRTUALLY ONLY these feeling states in his spontaneous verbal and

non-verbal communication

2. Feelings of Guilt

0 - Absent.

1 - Self reproach, feels he has let people down

2 - Ideas of guilt or rumination over past errors or sinful deeds

3 - Present illness is a punishment. Delusions of guilt

4 - Hears accusatory or denunciatory voices and/or experiences threatening visual hallucina-

tions

3. Suicide

0 - Absent

1 - Feels life is not worth living

2 - Wishes he were dead or any thoughts of possible death to self

3 - Suicidal ideas or gesture

4 - Attempts at suicide (any serious attempt rates 4)

4. Insomnia Early

0 - No difficulty falling asleep

1 - Complains of occasional difficulty falling asleep – i.e., more than 1/2 hour

2 - Complains of nightly difficulty falling asleep

5. Insomnia Middle

0 - No difficulty

1 - Patient complains of being restless and disturbed during the night

2 - Waking during the night – any getting out of bed rates 2 (except for purposes of voiding)

6. Insomnia Late

0 - No difficulty

1 - Waking in early hours of the morning but goes back to sleep

2 - Unable to fall asleep again if he gets out of bed

7. Work and Activities

0 - No difficulty

1 - Thoughts and feelings of incapacity, fatigue or weakness related to activities, work or

hobbies

2 - Loss of interest in activity, hobbies or work – either directly reported by patient, or

indirect in listlessness, indecision and vacillation (feels he has to push self to work or

activities)

3 - Decrease in actual time spent in activities or decrease in productivity

4 - Stopped working because of present illness

8. Retardation: Psychomotor (slowness of thought and speech; impaired ability to concentrate;

decreased motor activity)

0 - Normal speech and thought

1 - Slight retardation at interview

2 - Obvious retardation at interview

3 - Interview difficult

4 - Complete stupor

9. Agitation

0 - None

1 - Fidgetiness

2 - Playing with hands, hair, etc.

3 - Moving about, can’t sit still.

4 - Hand wringing, nail biting, hair-pulling, biting of lips.

10. Anxiety (psychological)

0 - No difficulty

1 - Subjective tension and irritability

2 - Worrying about minor matters

3 - Apprehensive attitude apparent in face or speech

4 - Fears expressed without questioning

11. Anxiety Somatic: Physiological concomitants of anxiety (i.e., effects of autonomic overac-

tivity, “butterflies,” indigestion, stomach cramps, belching, diarrhea, palpitations, hyperven-

tilation, paresthesia, sweating, flushing, tremor, headache, urinary frequency).

Avoid asking

about possible medication side effects (i.e., dry mouth, constipation)

0 - Absent

1 - Mild

2 - Moderate

3 - Severe

4 - Incapacitating

12. Somatic Symptoms (gastrointestinal)

0 - None.

1 - Loss of appetite but eating without encouragement from others. Food intake about normal

2 - Difficulty eating without urging from others. Marked reduction of appetite and food

intake.

13. Somatic Symptoms General

0 - None

1 - Heaviness in limbs, back or head. Backaches, headache or muscle aches. Loss of energy

and fatigability.

2 - Any clear-cut symptom rates “2”

14. Genital Symptoms (symptoms such as loss of libido; impaired sexual performance; menstrual

disturbances)

0 - Absent

1 - Mild

2 - Severe2

15. Hypochondriasis

0 - Not present

1 - Self-absorption (bodily)

2 - Preoccupation with health

3 - Frequent complaints, requests for help, etc.

4 - Hypochondriacal delusions

16. Loss of Weight

0 - No weight loss

1 - Probable weight loss associated with present illness

2 - Definite (according to patient) weight loss

3 - Not assessed

17. Insight

0 - Acknowledges being depressed and ill

1 - Acknowledges illness but attributes cause to bad food, climate, overwork, virus, need for rest, etc.

2 - Denies being ill at all

Total Score (total of circled responses): _____

HAMILTON ANXIETY RATING SCALE (HAM-A):

Below is a list of phrases that describe certain feeling that people have. Rate the patients by finding the answer which best describes the extent to which he/she has these conditions. Select one of the five responses for each of the fourteen questions.

0=not present; 1=mild; 2=moderate; 3=severe; 4-very severe.

1. Anxious mood

Worries, anticipation of the worst, fearful anticipation, irritability.

0 1 2 3 4

2. Tension

Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax.

0 1 2 3 4

3. Fears

Of dark, of strangers, of being left alone, of animals, of traffic, of crowds.

0 1 2 3 4

4. Insomnia

Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors.

0 1 2 3 4

5. Intellectual

Difficulty in concentration, poor memory.

0 1 2 3 4

6. Depressed mood

Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing.

0 1 2 3 4

7. Somatic (muscular)

Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone.

0 1 2 3 4

8. Somatic (sensory)

Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation.

0 1 2 3 4

9. Cardiovascular symptoms

Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat.

0 1 2 3 4

10. Respiratory symptoms

Pressure or constriction in chest, choking feelings, sighing, dyspnea.

0 1 2 3 4

11. Gastrointestinal symptoms

Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation.

0 1 2 3 4

12. Genitourinary symptoms

Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence.

0 1 2 3 4

13. Autonomic symptoms

Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair.

0 1 2 3 4

14. Behavior at interview

Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.

0 1 2 3 4

FAGERSTROM TEST FOR NICOTINE DEPENDENCE:

1. How soon after you wake up do you smoke your first cigarette?

♦ After 60 minutes (0)

♦ 31-60 minutes (1)

♦ 6-30 minutes (2)

♦ Within 5 minutes (3)

2. Do you find it difficult to refrain from smoking in places where it is forbidden?

♦ No (0)

♦ Yes (1)

3. Which cigarette would you hate most to give up?

♦ The first in the morning (1)

♦ Any other (0)

4. How many cigarettes per day do you smoke?

♦ 10 or less (0)

♦ 11-20 (1)

♦ 21-30 (2)

♦ 31 or more (3)

5. Do you smoke more frequently during the first hours after awakening than during the

rest of the day?

♦ No (0)

♦ Yes (1)

6. Do you smoke even if you are so ill that you are in bed most of the day?

♦ No (0)

♦ Yes (1)

Your score was:_____

Your level of dependence on nicotine is:

0-2 Very low dependence

3-4 Low dependence

5 Medium dependence

6-7 High dependence

8-10 Very high dependence

THE ALCOHOL USE DISORDERS IDENTIFICATION TEST:

1. How often do you have a drink containing alcohol?

(0)Never [Skip to Qs 9–10]

(1)Monthly or less

(2)2–4 times a month

(3)2–3 times a week

(4)4 or more times a week

2. How many drinks containing alcohol do you have on a typical day when you are drinking?

(0)1 or 2

(1)3 or 4

(2)5 or 6

(3)7, 8, or 9

(4)10 or more

3. How often do you have six or more drinks on one occasion?

(0)Never

(1)Less than monthly

(2)Monthly

(3)Weekly

(4)Daily or almost daily

Skip to Questions 9 and 10 if Total Score for Questions 2 and 3 = 0.

4. How often during the last year have you found that you were not able to stop drinking once you had started?

(0)Never

(1)Less than monthly

(2)Monthly

(3)Weekly

(4)Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you

because of drinking?

(0)Never

(1)Less than monthly

(2)Monthly

(3)Weekly

(4)Daily or almost daily

6. How often during the last year have you needed a first drink in the morning

to get yourself

going after a heavy drinking session?

(0) Never

(1) Less than monthly5

(2) Monthly

(3) Weekly

(4) Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?

(0)Never

(1)Less than monthly

(2)Monthly

(3)Weekly

(4)Daily or almost daily

8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

(0)Never

(1)Less than monthly

(2)Monthly

(3)Weekly

(4)Daily or almost daily

9. Have you or someone else been injured as a result of your drinking?

(0) No

(2) Yes, but not in the last year

(4) Yes, during the last year

10. Has a relative or friend or a doctor or another health worker been concerned about your

drinking or suggested you cut down?

(0) No

(2) Yes, but not in the last year

(4) Yes, during the last year

THE MRC (MEDICAL RESEARCH COUNCIL) BREATHLESSNESS SCALE:

The MRC Breathlessness Scale

Grade	Degree of breathlessness related to activities
1	Not troubled by breathlessness except on strenuous exercise
2	Short of breath when hurrying on the level or walking up a slight hill
3	Walks slower than most people on the level, stops after a mile or so, or stops after 15 minutes walking at own pace
4	Stops for breath after walking about 100 yds or after a few minutes on level ground
5	Too breathless to leave the house, or breathless when undressing

MASTER CHART

S. NO.	AGE GROUP	SEX	RELIGION	EDUCATION	OCCUPATION	FAMILY INCOME PER MONTH	SOCIO-ECONOMIC STATUS	MARITAL STATUS	TYPE OF FAMILY	SPUTUM POSITIVITY	EXTRAPULMONARY TUBERCULOSIS	DURATION OF TB ILLNESS IN MONTHS	DURATION OF ILLNESS CATEGORISED (1-<1YR, 2->/=1YR)	DYSPNOEA GRADE	MDR TB	RR-TB	XDR TB	H/O DEFAULT	H/O RELAPSE	H/O TREATMENT FAILURE	HIV CO-INFECTION	ATT DRUGS
1	2	1	1	1	2	2	4	1	4	2	2	10	1	2	2	2	2	1	2	2	2	2
2	2	1	1	2	3	3	4	2	1	2	2	6	1	1	2	2	2	1	2	2	2	2
3	2	1	1	3	3	2	4	2	1	1	2	1	1	2	2	2	2	2	2	2	2	1
4	3	1	1	1	3	3	4	1	2	2	2	12	2	2	2	2	2	1	2	2	2	2
5	2	1	1	1	3	2	4	1	1	2	2	6	1	2	2	2	2	1	2	2	2	2
6	3	1	3	4	3	2	4	5	4	2	2	12	2	5	2	2	2	1	2	2	2	2
7	3	1	1	1	3	3	4	2	2	2	2	7	1	2	2	2	2	1	2	2	2	1
8	3	1	1	3	4	3	4	2	1	1	2	1	1	3	2	2	2	2	1	2	2	2
9	3	1	1	2	4	3	4	1	1	2	2	6	1	2	2	2	2	1	2	2	2	1
10	2	1	1	2	2	2	4	2	1	2	2	12	2	2	2	2	2	1	2	2	2	2
11	3	1	1	3	4	4	3	2	1	1	2	1	1	2	2	2	2	2	2	2	2	2
12	3	1	1	3	3	3	4	2	2	1	2	18	2	5	2	2	2	1	2	2	2	2
13	2	2	3	4	1	3	4	2	2	1	2	3	1	5	2	2	2	2	2	2	2	1
14	2	2	1	4	1	4	4	2	2	1	2	1	1	4	2	2	2	2	1	2	2	2
15	2	2	1	3	1	3	4	2	2	2	2	4	1	2	2	2	2	2	2	2	2	1
16	2	2	1	3	1	3	4	2	2	2	2	1	1	1	2	2	2	2	2	2	2	1
17	3	2	1	2	1	3	4	2	1	1	2	12	2	4	2	2	2	1	2	2	2	2
18	2	1	1	1	4	3	4	4	4	1	2	3	1	5	2	2	2	2	2	2	1	1
19	3	2	1	4	1	4	4	2	1	1	2	1	1		2	2	2	2	2	2	2	1
20	2	2	1	5	1	3	4	1	1	2	2	1	1		2	2	2	2	2	2	2	1
21	3	1	1	2	3	3	4	2	1	1	2	5	1	2	2	2	2	2	2	2	2	1
22	2	1	1	2	3	3	4	2	1	1	2	2	1	1	2	2	2	2	2	2	2	1
23	2	2	1	1	4	3	4	2	2	1	2	6	1	2	2	2	2	2	2	2	2	1
24	2	1	1	1	2	4	4	2	1	1	2	5	1	4	2	2	2	1	2	2	2	2
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26	3	2	2	1	1	5	4	2	2	1	2	1	1		2	2	2	2	2	2	2	1
27	2	1	1	3	4	3	4	2	1	1	2	1	1	2	2	2	2	2	2	2	2	1
28	3	1	1	2	3	3	4	2	1	2	2	3	1	2	2	2	2	2	2	2	2	1
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32	3	1	1	1	3	2	4	2	1	2	2	1	1	2	2	2	2	2	2	2	1	2
33	2	1	1	1	4	3	4	2	1	1	2	4	1	2	2	2	2	2	2	2	2	1
34	3	1	3	2	4	4	4	3	1	1	2	12	2	2	2	2	2	1	2	2	2	2
35	3	1	1	3	3	3	4	3	2	2	2	12	2	3	2	2	2	1	2	2	2	2
36	4	1	1	3	1	3	4	2	1	1	2	1	1		2	2	2	2	2	2	2	1
37	2	1	1	1	2	3	4	2	1	1	2	12	2	1	2	2	2	1	2	2	2	2
38	3	1	1	4	3	3	4	2	4	1	1	1	1	3	2	2	2	2	1	2	2	2
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52	3	1	3	3	3	3	4	2	1	1	2	3	1	1	2	2	2	1	2	2	2	2
53	2	1	1	1	4	3	4	2	1	1	2	2	1	2	2	2	2	2	2	2	2	2

S. NO.	OTHER MEDICAL DISORDERS	ICD 10 DIAGNOSTIC CATEGORY OF PSYCHIATRIC ILLNESS	HAMD 17 SCORE	HAM A SCORE	ORM NICOTINE SCORE	AUDIT SCORE	HAM D17 GRADING	HAM A GRADING	FAGERSTROM SCORE GRADING	AUDIT GRADING	PAST H/O PSYCH ILLNESS	PAST H/O ALCOHOL DEPENDENCE	PAST H/O NICOTINE DEPENDENCE	H/O PSYCH ILLNESS
1		Mild depression	11				mild				2	2	2	2
2		Mild depression, Alcohol dependence, Nicotine dependence	8		3	27	mild		L	4	2	2	2	2
3	DM	Mild depression	10				mild				2	2	2	2
4		Alcohol dependence, Nicotine dependence			4	13			L	2	2	2	2	2
5		Alcohol dependence				15				2	2	2	2	2
6		Moderate depression, Alcohol dependence, Nicotine dependence	19		6	30	moderate		H	4	2	2	2	2
7	DM, MRD	Nicotine dependence			2				VL		2	2	2	2
8		Alcohol dependence				10				2	2	2	2	2
9	COPD	Alcohol dependence, Nicotine dependence			4	9			L	2	2	2	2	2
10	DM	Mild depression	11				mild				2	2	2	2
11	DM, CAD	Alcohol dependence, Nicotine dependence			1	25			VL	4	2	2	2	2
12		Moderate depression, Alcohol dependence, Nicotine dependence	18		6	26	moderate		H	4	2	2	2	1
13	Anemia, Gastritis	Moderate depression	20				moderate				2	2	2	2
14		Moderate depression, Unspecified anxiety disorder	15	6			mild	mild			2	2	2	2
15	Anemia,CCF										2	2	2	2
16											2	2	2	2
17	DM,SD	Mild depression	14				mild				2	2	2	2
18		Mild depression, Alcohol dependence	14			17	mild			3	2	2	2	2
19	DM										2	2	2	2
20		Mild depression, Nicotine dependence	15		2		mild		VL		2	2	2	2
21		Mild depression, Nicotine dependence	15		2		mild		VL		2	2	2	1
22	DM	Alcohol dependence, Nicotine dependence			2	24			VL	4	2	2	2	2
23	CVA										2	2	2	2
24		Mild depression, Alcohol dependence	16			25	mild			4	2	2	2	1
25		Moderate depression, Alcohol dependence	20			17	moderate			3	2	2	2	2
26	DM	Mild depression	10				mild				2	2	2	2
27	DM	Alcohol dependence				6				1	2	2	2	2
28											2	2	2	2
29	HT, DM	Alcohol dependence				15				2	2	2	2	1
30		Alcohol dependence				14				2	2	2	2	1
31		Mild depression	12				mild				1	1	2	1
32		Moderate depression, Unspecified anxiety disorder	25	15	3	16	moderate	mild	L	3	2	2	2	1
33	DM	Mild depression	10				mild				2	2	2	2
34		Mild depression	8				mild				2	2	2	2
35		Alcohol dependence, Nicotine dependence			2	13			VL	2	2	2	2	2
36	HT, DM										2	2	2	2
37											2	2	2	2
38	Chronic pancreatitis	Severe depression, alchohol dependence, nicotine dependence	29		2	14	severe		VL	2	2	2	2	1
39		Mild depression, Alcohol dependence	10			21	mild			4	2	2	2	1
40	DM	Mild depression, Alcohol dependence	13			9	mild			2	2	2	2	1
41											2	2	2	1
42		Alcohol dependence, Nicotine dependence			3	14			L	2	2	2	2	2
43		Moderate depression, Alcohol dependence	18			30	moderate			4	2	2	2	1
44		Alcohol dependence, Nicotine dependence			1	19			VL	3	2	2	2	1
45						14				2	2	2	2	2
46		Alcohol dependence, Nicotine dependence	12		6	21	mild		H	4	2	2	2	1
47	HT, DM	Moderate depression	22				moderate				2	2	2	2
48	HT, DM	Mild depression, unspecified anxiety disorder	17	19			moderate	moderate			2	2	2	2
49	DM, COPD	Nicotine dependence			2				VL		1	1	2	1
50		Mild depression, unspecified anxiety disorder	12	7		30	mild	mild		4	1	2	1	1
51	Pleural effusion	Alcohol dependence, Nicotine dependence, severe depression, unspecified anxiety disorder	27	15	1	32	severe	mild	VL	4	2	2	2	1
52		Alcohol dependence, Nicotine dependence			2	21			VL	4	2	2	2	1
53	DM	Moderate depression, Unspecified anxiety disorder	22	14			moderate	mild			1	1	1	1

S. NO.	AGE GROUP	SEX	RELIGION	EDUCATION	OCCUPATION	FAMILY INCOME PER MONTH	SOCIO-ECONOMIC STATUS	MARITAL STATUS	TYPE OF FAMILY	SPUTUM POSITIVITY	EXTRAPULMONARY TUBERCULOSIS	DURATION OF TB ILLNESS IN MONTHS	DURATION OF ILLNESS CATEGORISED (1-<1YR, 2->/=1YR)	DYSPNOEA GRADE	MDR TB	RR-TB	XDR TB	H/O DEFAULT	H/O RELAPSE	H/O TREATMENT FAILURE	HIV CO-INFECTION	ATT DRUGS
54	3	1	1	2	2	3	4	2	1	1	2	1	1	2	2	2	2	2	1	2	2	2
55	3	1	1	2	3	2	4	2	1	1	2	1	1	3	2	2	2	2	1	2	2	2
56	3	1	1	2	3	3	4	1	2	1	2	2	1	3	2	2	2	2	2	2	2	1
57	3	2	2	1	1	3	4	3	2	1	2	2	1	5	2	2	2	2	2	2	2	1
58	2	2	1	1	1	3	4	2	1	1	2	1	1	5	2	2	2	2	1	2	2	2
59	3	1	1	4	2	4	4	2	1	1	2	3	1		2	2	2	2	2	2	2	1
60	2	1	2	1	1	3	4	4	4	1	2	5	1	2	2	2	2	1	2	2	2	2
61	3	1	1	1	3	1	4	2	1	1	2	1	1	3	2	2	2	2	1	2	2	2
62	3	1	1	2	1	3	4	2	1	1	2	6	1	4	2	2	2	2	2	2	2	1
63	4	1	1	2	2	3	4	2	1	1	2	6	1		2	2	2	1	2	2	2	2
64	2	1	1	3	4	4	3	4	4	1	2	6	1	5	2	2	2	1	1	2	2	2
65	2	1	1	2	3	2	4	4	4	1	2	1	1		2	2	2	1	2	2	2	2
66	3	1	3	1	1	2	5	2	1	1	2	6	1	4	2	2	2	1	2	2	2	2
67	3	2	1	2	1	3	4	2	1	1	2	2	1	2	2	2	2	1	2	2	2	2
68	3	1	3	3	1	3	4	2	1	1	2	1	1		2	2	2	2	2	2	2	1
69	2	2	1	1	2	3	4	1	1	1	2	1	1	3	2	2	2	2	2	2	2	1
70	2	1	3	1	3	3	4	2	1	1	2	2	1	1	2	2	2	1	2	2	2	2
71	3	1	1	3	1	3	4	4	4	1	2	18	2	5	2	2	2	2	2	2	2	1
72	2	1	1	3	1	3	4	4	4	1	1	4	1	5	2	2	2	1	2	2	2	2
73	3	1	1	3	3	4	4	2	1	1	2	1	1	3	2	2	2	2	2	2	2	1
74	3	1	1	3	3	4	4	2	1	1	2	24	2	4	2	2	2	1	2	2	2	2
75	3	1	2	1	4	4	4	2	2	1	2	24	2	4	2	2	2	1	2	2	2	2
76	4	2	1	1	1	2	5	2	2	1	2	2	1		2	2	2	2	2	2	2	1
77	3	2	1	3	1	3	4	3	2	1	2	6	1	3	2	2	2	2	2	2	2	1
78	2	1	3	3	1	2	4	2	1	1	2	3	1	3	2	2	2	1	1	2	2	2
79	2	1	1	1	3	4	4	2	1	1	2	6	1		2	2	2	1	2	2	2	2
80	3	1	2	3	4	3	4	2	1	1	2	2	1	1	2	2	2	2	2	2	2	1
81	3	1	1	3	1	3	4	3	2	1	2	5	1		2	2	2	2	2	2	2	1
82	2	1	1	2	1	2	4	1	2	1	2	6	1	3	2	2	2	1	2	2	2	2
83	2	1	1	1	1	5	4	2	2	1	2	6	1		2	2	2	1	2	2	2	2
84	3	1	1	2	1	2	4	2	1	1	2	24	2	3	2	2	2	1	2	2	2	2
85	3	1	1	1	1	2	5	2	1	2	2	1	1	5	2	2	2	2	2	2	2	1
86	3	1	1	2	1	3	4	2	1	2	2	3	1	2	2	2	2	2	2	2	2	1
87	4	1	2	1	1	4	4	2	2	2	2	1	1	4	2	2	2	2	2	2	2	1
88	3	1	1	3	1	2	4	2	1	1	2	6	1	3	2	2	2	2	2	2	2	1
89	3	1	1	2	3	2	4	2	2	1	2	7	1	4	2	2	2	2	1	2	2	2
90	2	1	1	4	4	4	3	2	1	1	2	12	2		2	2	2	1	1	2	2	2
91	2	1	1	3	1	2	4	1	1	1	2	2	1	1	2	2	2	1	2	2	2	1
92	3	1	1	3	1	3	4	4	4	1	2	5	1	2	2	2	2	2	2	2	2	1
93	2	1	1	3	4	5	3	2	1	1	2	1	1		2	2	2	2	2	2	1	1
94	3	1	1	1	3	3	4	2	1	1	2	3	1		2	2	2	2	2	2	2	1
95	3	1	1	1	1	3	4	2	1	1	2	36	2	4	2	2	2	1	2	2	2	2
96	2	2	1	4	1	3	4	1	1	1	2	6	1	5	2	2	2	2	2	2	2	1
97	4	2	1	1	1	3	4	3	2	1	2	2	1	3	2	2	2	2	2	2	2	1
98	2	2	3	1	1	3	4	2	1	1	2	6	1	4	2	2	2	1	2	2	2	2
99	2	1	1	1	1	3	4	3	2	1	2	3	1	3	2	2	2	1	2	2	2	2
100	3	2	1	2	1	4	4	2	1	1	2	3	1	3	2	2	2	2	2	2	2	1
101	2	2	1	3	1	5	4	2	1	2	1	2	1	4	2	2	2	1	2	2	1	1
102	2	1	1	3	1	3	4	1	2	1	2	12	2	3	2	2	2	1	2	2	2	1
103	3	1	1	1	1	3	4	4	1	1	2	1	1	3	2	2	2	2	1	2	2	2
104	2	1	1	3	4	5	3	2	2	2	2	1	1	3	2	2	2	2	2	2	2	1
105	2	1	1	3	4	5	3	1	1	1	2	1	1	3	2	2	2	1	2	2	2	2
106	3	1	2	3	4	4	3	2	1	1	2	2	1	4	2	2	2	2	2	2	2	1

S. NO.	OTHER MEDICAL DISORDERS	ICD 10 DIAGNOSTIC CATEGORY OF PSYCHIATRIC ILLNESS	HAMD 17 SCORE	HAM A SCORE	FAGERSTORM NICOTINE SCORE	AUDIT SCORE	HAM D17 GRADING	HAM A GRADING	FAGERSTROM SCORE GRADING	AUDIT GRADING	PAST H/O PSYCH ILLNESS	PAST H/O ALCOHOL DEPENDENCE	PAST H/O NICOTINE DEPENDENCE	FAMILY H/O PSYCH ILLNESS
54	SD	Alcohol dependence, Nicotine dependence			6	14			H	2	2	2	2	1
55		Mild depression, unspecified anxiety disorder, Alcohol dependence, Nicotine dependence	14	19	9	21	mild	moderate	VH	4	2	2	2	1
56											1	1	2	1
57		Moderate depression, Unspecified anxiety disorder	21	9			moderate	mild			2	2	2	2
58											2	2	2	2
59	DM	Mild depression, alcohol dependence	12			14	mild			2	2	2	2	1
60		Alcohol dependence				14				2	1	2	1	2
61		Mild depression, unspecified anxiety disorder, nicotine dependence	14	10	3		mild	mild	L		2	2	2	2
62	COPD, hydrocele	Mild depression, alcohol dependence	14			14	mild			2	1	2	1	1
63		Alcohol dependence, Nicotine dependence			7	11			H	2	2	2	2	2
64		Moderate depression, Unspecified anxiety disorder, Alcohol dependence, Nicotine dependenc	25	20	3	21	moderate	moderate	L	4	2	2	2	1
65		Moderate depression, Alcohol dependence, Nicotine dependence	21		4	37	moderate		L	4	2	2	2	1
66		Moderate depression, Alcohol dependence	24			24	moderate			4	2	2	2	1
67	DM	Mild depression, unspecified anxiety disorder	12	14			mild	mild			2	2	2	2
68		Mild depression, unspecified anxiety disorder, Alcohol dependence	14	12		32	mild	mild		4	2	2	2	1
69		Alcohol dependence, Nicotine dependence			3	14			L	2	2	2	2	1
70		Moderate depression, Alcohol dependence	21			14	moderate			2	2	2	2	1
71		Moderate depression, Alcohol dependence, Nicotine dependence	16		2	34	mild		VL	4	2	2	2	2
72	DM	Moderate depression, unspecified anxiety disorder, Alcohol dependence, Nicotine dependence	24	14		25	moderate	mild		4	2	2	2	1
73	DM	Mild depression, Alcohol dependence, Nicotine dependence	14		6	25	mild		H	4	2	2	2	1
74		Alcohol dependence, Nicotine dependence			4	24			L	4	2	2	2	1
75		Mild depression, Alcohol dependence, Nicotine dependence	12		3	11	mild		L	2	2	2	2	2
76	DM, HT										2	2	2	2
77											2	2	2	1
78	DM	Alcohol dependence				11				2	2	2	2	2
79		Moderate depression, unspecified anxiety disorder, Alcohol dependence, Nicotine dependence	22	14	3	26	moderate	mild	L	4	2	2	2	1
80	DM, HT, Diabetic nephropathy	Mild depression, Alcohol dependence, Nicotine dependence	10		3	24	mild		L	4	2	2	2	1
81											2	2	2	2
82		Alcohol dependence				19				3	2	2	2	1
83		Alcohol dependence, Nicotine dependence			4	26			L	4	2	2	2	2
84	Right corneal opacity	Severe depression, unspecified anxiety disorder, alchohol dependence syndrome, nicotine dependence syndrome	29	9	4	37	severe	mild	L	4	2	2	2	1
85	COPD, right pleural effusion	Severe depression, unspecified anxiety disorder, alchohol dependence syndrome	31	16		24	severe	mild		4	1	2	1	1
86		Mild depression	12				mild				1	1	1	1
87	DM, HT, cholelithiasis	Unspecified anxiety disorder		9				mild			2	2	2	2
88		Severe depression, alchohol dependence	26			24	severe			4	1	2	1	1
89		severe depression	26				severe				1	1	1	1
90	DM										2	2	2	2
91		Moderate depression, Alcohol dependence	21			32	moderate			4	2	2	2	1
92		Moderate depression, Alcohol dependence, Nicotine dependence	23		3	36	moderate		L	4	2	2	2	2
93		Severe depression, unspecified anxiety disorder, alchohol dependence syndrome, nicotine dependence syndrome	27	12	1	26	severe	mild	VL	4	2	2	2	2
94	DM	Moderate depression, unspecified anxiety disorder, Alcohol dependence, Nicotine dependence	21	12	3	24	moderate	mild	L	4	2	2	2	2
95		Mild depression, Alcohol dependence, Nicotine dependence	12		2	21	mild		VL	4	2	2	2	1
96		severe depression, unspecified anxiety disorder	27	19			severe	moderate			2	2	2	2
97	DM	Moderate depression, Unspecified anxiety disorder	21	12			moderate	mild			2	2	2	2
98		Severe depression, generalised anxiety disorder	27	21			severe	moderate			2	2	2	2
99		moderate depression, nicotine dependence	22		1		moderate		VL		1	1	2	2
100	DM	severe depression, unspecified anxiety disorder	28	19			severe	moderate			2	2	2	2
101	SD	severe depression, unspecified anxiety disorder	28	23			severe	moderate			2	2	2	1
102		Alcohol dependence				14				2	2	2	2	1
103		Mild depression, Alcohol dependence, Nicotine dependence	12		4	19	mild		L	3	2	2	2	2
104		Mild depression, unspecified anxiety disorder, Alcohol dependence, Nicotine dependence	12	11	3	14	mild	mild	L	2	2	2	2	1
105		Mild depression, Alcohol dependence, Nicotine dependence	14		6	32	mild		H	4	2	2	2	1
106		Mild depression, Alcohol dependence, Nicotine dependence	13		3	27	mild		L	4	2	2	2	2